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Table of Contents.

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ORIGINAL ARTICLES— Page.
A Plan for Racial Health, by Stanley Boyd 285
The Estimation of the Iso-Agglutinin Titre of Human Serum, and its Practical Applications, by Lucy M. Bryce and Rachel Jakobowicz .. 290
The Treatment of Fibrositis and Allied Disorders by Local Anæsthesia, by Michael Kelly 294
The Use of Local Anæsthesia in the Relief of Chronic Pain, by Russell N. Howard, M.D., F.R.C.S. 298

REPORTS OF CASES—
Prolapse of a Fœtal Arm and Antenatal Hæmorrhage, by Mary C. De Garis 299

REVIEWS—
Physiology for Nurses 300
Crichton Royal 300
MacKenzie's "Action of Muscles" 300
The Neurogenic Bladder 301
A Year Book of Pathology and Immunology 301
Anæsthesia for the Student and General Practitioner 302
A Year Book on Public Health 302

NOTES ON BOOKS, CURRENT JOURNALS AND NEW APPLIANCES—
A Volume of Post-Graduate Lectures 302
A Book on Treatment in General Practice 302

LEADING ARTICLES—
Medical Sociology 303
Wireless Transmitting Apparatus (Possession) Order 304

CURRENT COMMENT— Page.
Glossitis and the Vitamin B_2 Complex 304
Carcinogenic Agents in the Liver 304
Administration of Bile in Obstructive Jaundice .. 305

ABSTRACTS FROM MEDICAL LITERATURE—
Medicine 306

BRITISH MEDICAL ASSOCIATION NEWS—
Scientific 308

MEDICAL SOCIETIES—
Melbourne Pædiatric Society 309
The Medical Sciences Club of South Australia .. 310
The Australian and New Zealand Association of Radiology 311
The Medical Defence Society of Queensland 311

NAVAL, MILITARY AND AIR FORCE—
Appointments 312

CORRESPONDENCE—
Astrology 312
Local Anæsthesia and Retrosternal Goitre 313
Paralysis of the Serratus Anterior Muscle Complicating Dislocation of the Shoulder 313
Some Medical Aspects of Crime 313

OBITUARY—
Eric Bailhache 313
Frank Tidswell 314

NOTICE 314
NOMINATIONS AND ELECTIONS 314
BOOKS RECEIVED 314
DIARY FOR THE MONTH 314
MEDICAL APPOINTMENTS: IMPORTANT NOTICE .. 314
EDITORIAL NOTICES 314

A PLAN FOR RACIAL HEALTH.[1]

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Preamble.

THERE are certain premises and guiding principles which have based and bounded my thinking upon the subject for our consideration, which should be stated before we come to actual proposals. For whatever it may be worth, this plan is based on the ideas that our race is not in existence without a Maker and a design. I make this confession with some diffidence, for there are, no doubt, some of us whose faith is great enough to believe that mankind is the product of an almost fortuitous play of evolutionary forces, and that we are like Topsy, in "Uncle Tom's Cabin", who said: "I 'spect I growed. Don't think nobody never made me."

I can only say that though I have not got so far as Kipling's Evarra-man, who ventured to shape the great designer, and have, therefore, not been tempted to formulate his wonderous law, "Thus gods are made and whoso makes them otherwise shall die", I have dared to study the things made, with the purpose of gaining enough understanding of man's structure and his direction, to become an intelligent worker in the field of creative physiology.

For me it has become unthinkable that we should agree with those theologians who teach that the work of creation is complete. The presence in us all of a divine discontent, and the impulse common to so many human minds to contribute to human betterment, are (to me) proofs conclusive that there is bound up in our natures the certainty of a greater future for our race. Surely no one who has had to study the structure and organization of the human body can believe that what we see around us is the finished work of a being or power capable of bringing such a miracle into existence?

Having laid down these premises, I shall ask you to bear with me while I state some of the principles which have guided me in this study.

Guiding Principles.

Man's Cure in Man.—The first principle is this: a "cure", however excellent, will not heal unless there are in the patient the power and the desire for recovery. We must therefore seek, in the study of man himself, the means and the motives for his healing.

Man and Mankind.—I come now to my second principle. In the same way as man is a composite of many more or less highly organized cells and their products, so society is an interdependent composite of individuals and their activities. In our search for the causes and cure of the sickness of the human family, we may wisely follow the analogies derived from our consideration of the physiology of individuals.

Man's Mind Tells Man's Tomorrow.—Since human activities and achievement appear to arise in instincts and imaginative flights of man's mind, and even so-called impossible dreams are almost every day becoming materialized, we may venture to predict future human development from the myths, poetic fancies, day-dreams and inventions which man produces. The miraculous and the supernatural should also have our careful study, nor should any of the impulses of thought escape our critical scrutiny. Only by knowing completely all of these products of our minds, whether they seem bad or good at first sight, shall we ultimately achieve command of our whole being and find the proper place and proportion for every power we possess. It is surely axiomatic that every power and impulse of normal human minds is good for something. Any one of

[1] Read at a meeting of the Western Australian Branch of the British Medical Association on November 20, 1940.

them may be abused by neglect, by excess, or by complete misapplication; but the royal road to absolute conquest of this kingdom is determined and deliberate self-knowledge, which alone can bring about effective and well-balanced self-organization. Never should we be content with: "What man has done man can do"; our slogan must be: "What man can think, that he will some day achieve."

Man's Two Natures.—If ever we doubt the power or the willingness of man to progress, we may renew our courage by learning to distinguish between his two natures. The one is fundamental and inherent; but the other is no more than the habits which he has (often unconsciously) acquired.

It is true that habits are so much second nature that we often think of them as inherent and unchangeable; but we shall some day learn to think better and free ourselves from this stultifying heresy.

The Plan.

For those of you whom I had the honour of addressing last year, may I add that this plan was written several years ago, and that it traverses in some degree the same ground as I then covered. I shall ask you to excuse this repetition, as it forms a necessary part of the argument followed in the outline which I present for your consideration tonight.

While I have been preparing this writing of my plan, I have been reading that wonderful book "Man the Unknown", by Dr. Alexis Carrel. You may imagine with what enchanced confidence I offer you this paper, since I have found that Carrel, bringing to his work mental attainments which are unrivalled and utilizing opportunities of scientific research which must be almost unique, comes to many conclusions essentially similar to my own.

In my years of striving to have these proposals authoritatively considered, I have many times wondered whether the fires at which I worshipped were merely will-o'-the-wisp flares of my own igniting; whether, though true for me, the ambitions and convictions which possessed me were what I had striven most to avoid, and would prove to be so alien from the spirit and life of the rest of mankind as to be unpractical, Utopian, star-begotten, out of harmony with the immortal spirit and destiny of man.

These fears have been silenced for me by Carrel's work.

Apology.

The spectacle of preventible suffering with which every doctor is daily confronted has driven me not merely to wonder why human beings accept it as their inevitable heritage, but to speculate what might be done by ordinary people to secure for their children a greater resistance against disease and to lessen their liability to inherit mental and physical deformity.

Until the Union of Soviet Socialist Republics announced a policy of utilizing science in every department of governmental activity, I had laid aside all such proposals as had occurred to me as unpractical; for, to be fully effective, any attempt at a solution of these problems should, because of the interdependent nature of society, be applied throughout the community in which it is tried.

This announcement, however, determined me to put into the form of a plan those ideas concerning human generation which had from time to time passed through my mind in the course of my work as a doctor.

The Aim of the Plan.

The proposals of this plan are directed towards the apparent aim of evolution: the perfectly adapted and adaptable human being. It has been written in the hope that a time has come when man will be ready to bring a larger proportion of reason to bear upon a part of life hitherto left almost entirely in the realm of instinct.

Although the application of reason and knowledge to the business of reproduction is necessary to this plan, it by no means advocates the exclusion of instinct or emotion, for we can serve our race adequately only by bending to its purpose the whole of our composite being. In doing this we shall do no more than happens in the physical realm, for by means of their internal secretions our reproductive tissues actually permeate and inform the development of all the other tissues of our bodies. Society has already begun to relax the taboo which in my earlier years effectively excluded the subject of reproduction even from the education of doctors.

Even without much assistance from our intelligence, evolution has produced in mankind all the advances which we may perceive to have so far occurred; but a greatly enhanced achievement may with confidence be expected when knowledge is brought to cooperate with the forces of evolution as a result of concerted planning. In thinking of our aim, let us realize that our work is to serve the processes of nature, not to try to mould its operations towards some preconceived or dogmatic standard.

We are not yet able precisely to define the future outworkings of the evolution of our race; but we may be certain that as they step by step unfold, ever-growing vistas will provide fresh adventure and miracle for the succeeding generations of mankind. If we remember this we shall not try to create Utopias. The urge for exploration and the unknown must be directed towards our own territory, that inward kingdom so much of which is still unsubdued, but which promises riches as yet only dreamed of to those who will venture its conquest. In this there is scope not merely for an occasional Columbus, but for the development in every one of us of that longing to dare and discover which is so often atrophied because it cannot find its exercise and expression in the outward world.

Method.

In the pursuit of this aim there are two lines along which we must work. First, we must improve and ultimately perfect the materials which serve the reproductive instinct. Next, but not of less importance, we must instruct and educate every potential parent in the science and art of parenthood.

Good Stuff for Begetting.—Under the first heading we are faced with the problem of how to get good stuff for begetting. Our body is composed of many units so closely interdependent that if only one of them is injured none of the rest can escape some degree of injury. Every illness illustrates this fact. The patient with pneumonia, which we look upon as a disease of the lung, will sometimes find a groove across his nails indicating that his nail-building cells have also been injured.

In such a community it is impossible for any cell to escape if only one member is diseased, and of course this applies to the generative tissues, which, sharing a common source of nutrition, inevitably share the fortunes of the health of the whole body.

If we wish, then, to secure sound sperm and germ, we must bring every part of the bodies of all who may become parents into a well-balanced development, so that those cells which may be destined to originate new individuals shall be nourished by blood perfect in its cellular and fluid content, perfectly aerated in the lungs and as free as possible from poisons of every kind. Such blood can be made only in a body proportionately developed and exercised; properly fed, housed and clad in accordance with æsthetic as well as hygenic standards; free from disease of every part, and protected from the action of racial poisons.

We cannot hope to secure such bodies as these unless we make a radical change in our warfare against disease. We must adopt and employ the principle of total war. Our doctors are not being used to the best advantage. What should we think of a seaside land-owner whose cliff-top pathways had become undermined by the erosion of the waves and who, instead of making safe paths, contented himself with building an accident hospital, fully equipped with ambulances and staff, to treat promptly those who were injured by landslides on his property? Yet the existing method of paying doctors for the treatment of illness is just as stupid as that. Instead, we should pay them to be teachers and builders of health, preventing disease whenever possible. This has been taught by Samuel Butler, Bernard Shaw, and in our own profession by Sir James Mackenzie, who gave the later part of his life to the

organization in St. Andrews of a medical society devoted to research in general practice for the discovery of those fine deflections from normal which forerun disease. The late Lord Moynihan also, in his later lectures, repeatedly asserted that the medicine of the future would be directed towards the prediction and prevention of pathological changes.

With this racial purpose in view, doctors must be trained to examine their people from birth and while they are in apparent health. They must be set to teach the hygienic management of life, so that health is built and sustained. This will bring into the main field of research the whole army of general practitioners who will be enabled by this more hopeful direction of their work to become real doctors of health.

When we at last become associated in the minds of our people with health instead of with illness, this periodic examination of all will carry no morbid suggestion to persons of neurotic tendency, and the early recognition of a predisposition to neurosis will enable appropriate treatment to be applied to the greatest advantage.

It will be our duty as health teachers to instruct our clients at first as to the reason why society needs to prevent rather than to cure disease. They must be taught that it is not primarily for the purpose of increased industrial productivity (though that will certainly be one of the by-products of the new system), nor merely to enable the members of the State to enjoy their lives more fully (an equally sure result); but that the purpose is to secure their fitness for, and happiness in, the most vital function of human society, which is the production of offspring equipped as perfectly as possible for their share in citizenship.

As with the individual, so with the social organism; it will not be enough to have only the reproducers healthy. Each citizen will have to learn to present his own quota of health to the community, so that the children who are born healthy may be able to develop free and fearless for the future race.

I submit to you the assertion that prenatal maternal care is insufficient. In civilization it is already a commonplace that expectant mothers shall have special provision for the care of their health in the work of child-bearing, birth and lactation. Under this plan the next logical step will have to be taken to make the health of the sperm-maker as well as that of the germ-bearer an object of prophylactic care. By this means the work of our profession will be directed pregeneratively instead of merely prenatally.

Enough is known already of racial physiology to contradict the popular fallacy (based no doubt upon the fact that the child lives for the entire period of gestation within its mother's body) that the health of the male element is of relatively little importance. The effect of those poisons rightly described as "racial"—alcohol, syphilis, gonorrhœa, lead and certain radiations—even when the male parent only is exposed to them, gives sufficient evidence of the importance of paternal health. There is, therefore, specific as well as general cogency in the demand that the health of potential fathers should become the object of as great concern as we give to that of mothers.

While probably all our people will not at first avail themselves of such a service from their doctors, I believe that very powerful natural impulses will reinforce the educational work of the plan and prove much more effective agents for bringing all to take part in its activities than the fear of personal ill-health, which is the motive at present relied upon for the maintenance of health. We humans are more profoundly moved by reproductive impulses than by the instinct of self-preservation, even when reason is (relatively speaking) excluded. We may therefore reasonably expect that when this service is provided and people begin to realize that it is the health of the children they are being asked to protect, there will be a more rapid leavening of the whole lump of society than some would think.

We shall have to intensify our search for "the food of the gods". Experiment has proved it possible to breed a race of rats, which over several generations remains free from disease, simply by feeding them with a well-balanced diet and herding them in clean, well-ventilated quarters.

Certain diseases can be produced at will in this colony merely by the removal of one element or another from their diet. These diseases can be predicted with accuracy, and they can be cured if they have not gone too far if the items previously omitted are replaced in the food.

It is probably only a matter of time until a like achievement will be won for our own race. That time would be much shortened under my plan, when the impetus towards and the facilities for research in prophylactic directions will be greatly increased; for once it is established, our rewards of remuneration and recreation will be proportionate to our success in the reduction of preventible illness.

A further clue to the solution of this problem has lately come into prominence as a result of Sir Albert Howard's Indore experiments. He has found that his cattle, bred and fed upon fodder from soil renewed by humous compost instead of chemical manures, are resistant to infections of rinderpest, foot-and-mouth disease and septicæmia, in spite of the fact that they are neither segregated nor inoculated. Incidentally, his crops and fodder were also found to be resistant to both fungous and insect pests. (Dr. Lionel Picton's review of Howard's book, "An Agricultural Testament", is to be found in *The British Medical Journal* of July 27, 1940, at page 128.)

"Cure."—So long as society contents itself with engaging its doctors for treatment only when disease has already injured some tissue or organ, it is condemning its medical service to a hopeless task, for there is no such thing as complete recovery once pathological change has occurred. Indeed, it is probable that while the present system prevails, doctors will always be too busy patching up the injured to attend effectively to the safe-guarding of the fit. This fatuity has haunted and paralysed progress in every effort to organize national health.

If it were found that there are not enough doctors to provide preventive examinations for the whole community, it might be necessary at first to limit such a service at some arbitrary age; but it should start at birth and extend to adolescence at the very least, until enough doctors were trained for its full performance. It will, however, be clear that as soon as the prophylactic work upon even only a part of the community produces its effect, doctors hitherto fully occupied with treatment will be liberated to take their share in the preventive side of the work.

Prompt Racial Effect.—It should be clear that this step will have a prompt racial effect. With this plan in action, all persons with transmissible or hereditary disease will rapidly become known to the medical service and to the individuals themselves. They will have to be informed of the responsibility they would be shouldering were they to undertake parenthood. The judicious dissemination of this knowledge, as well as that of the many other factors which influence the health of progeny, will of course be a necessary part of the work of the doctors, as they gradually undergo the change from doctors of medicine to doctors of health.

The natural desire of human beings for the happiness and welfare of their children is already bringing about, by means of birth control, the limitation of families to such numbers as can be provided with a decent start in the world. This same concern will no doubt operate more and more effectively to prevent the undertaking of parenthood by those who become aware that they are suffering from defects which may prejudice the chances of their children's inheriting an effective equipment for the battle of life.

The humane sterilization of those who are mentally or otherwise medically unfit for parenthood, while it should undoubtedly be undertaken by the State at the outset of the plan, will naturally become less and less necessary as time goes on.

When we doctors are so remunerated that no profit comes to us from illness and we are in fact actually rewarded for the health of our people, the professional ban upon the public teaching of health by general practitioners will be

removed. For it will soon be perceived that the doctor who has the gift of teaching would be a public enemy were he to withhold this service, and further, its exercise would be of material profit both to the people and to the professional guardians of their health.

The Guidance of Racial Energy.

We now come to the second portion of our work which will be to guide racial energy. Having established the health service of the country to the best advantage and thus begun the work of the making of healthy germ and sperm in our generation, it will be the duty of the organizers of the plan deliberately to make our nation race-minded, and to foster by lectures, broadcasts and every other educational agency a "cult of healthy parenthood".

From his new strategic position, the general practitioner will naturally have to carry the chief burden of this educational work. Advising upon the nutrition of the baby from birth, he will be seeing the child and its mother at least every month of its first year of life. His confessed purpose of building the child's health with a view to preparing it for its highest responsibility in citizenship, will take its part in the dispersion of the last relics of that false and prudish ignorance which in many minds still shrouds the subject of reproductive activity.

Nobody would wish to undermine the natural reticence and reserve most people feel regarding intimate and sacred things in their life; but it should be a recognized part of the work of the family doctor to dissipate the prudery which has masqueraded as decent reserve, and make it possible for people to admit into the realms of proper thought as deliberate a preparation for the work of parenthood, in both physical and mental spheres, as is at present devoted to instruction for any domestic or other craft work.

The health records, which would be begun during the first year of life, should be of such character as to form the basis of a continuous record which would become as essential a possession of every citizen as is a passport to a traveller. The continuity of this work in the hands of the family doctor with each succeeding stage of the lives of his people will liberate school medical officers for the general medical service.

There is no better example of the futility of having the work of public health divorced from general practice than the present system of school medical examination. Since I have been in Gnowangerup, a period of five years, I have not once been visited by a school medical officer, and I have seen a report upon only five children. It was the same in England, where I believe eight or more separate authorities share the control of the various medical services. The family doctor, who is supposed to carry out the recommendations of these officers, very rarely even hears that a child has been examined. And yet, as I found, when during the last war I acted as temporary educational medical officer, 93% of the children in the schools in my district were really in need of medical attention for some defect or other.

I make no apology for repeating what I said last year to you regarding the stupidity of leaving the nutrition of the new-born in the hands of lay committees and trained nurses. Have these had the opportunity to learn any more than certain empirical methods of examination and advice? Can the real problems of physiology and optimum development be decided by the one criterion of increasing weight? In four years not one baby has reached me from the nurse visiting our district, and I know that she has been consulted by parents with babies who were really ill.

The racial problem requires that the general practitioner be transferred from the class of necessary evils, only to be used perforce in emergencies when health and life are already endangered, and that he be given his proper part to play as an essential portion of the health service of the nation.

Our work for school children must be dual, for the educational side goes hand in hand with the vigilant prophylactic protection of the health in the physical sphere. This will lead naturally to definite educational courses which we must organize for the special preparation of future parents for the expert work of marriage and procreation.

Is there any result of the sex taboo more tragic than this, that we require men to undergo apprenticeships of five or more years before we let them make a chair or repair a mechanical gadget, but we launch our children into parenthood without any instruction whatsoever? Plenty of them have been given no help even in the elementary physiology of marriage.

Shall we leave it, as has happened in the United States of America, for the educational bodies to institute such vocational instruction for their undergraduates? If we do, we shall have allowed to slip from our fingers a unique opportunity to bridge the widening gap which separates us from the true health service of our nations.

I feel very deeply that this is by no means merely an academic question. Not only does it concern our proper part in the national life, but the way we answer it will determine in a profound degree both our prestige and our economic status in society.

Preventive medicine, with or without us, will very soon reduce the occurrence of the diseases by which we at present earn our living, and here we have in our hands a means of forging a place in society which will enable us to serve it in a far more vital and valuable way.

Our own prestige (and this is every bit as valuable to our people as it is to ourselves) and our future financial status will to a very large extent depend upon whether we introduce these alterations in our service ourselves as a profession or await their introduction by outside authority or other social pressure.

While all this educational work is being carried on side by side with the prophylactic and therapeutic portions of our service, there must be organized research into all the problems of perfecting human reproduction, as well as a continuance of research into the more complete nutrition of the individual and the building up of his immunity against infections.

One of the most valuable results of the unification of all the medical services under one authority will be the expeditious application of the results of such researches throughout the whole of the nation.

The Population Problem.

So much for the outline of the practical proposals which have occurred to me as necessary to success, if we undertake to plan for a perfecting of our race. We are, however, entitled to inquire into the probable or possible outcome of such planning, and in what is to follow I have tried to state briefly some economic aspects of our population problem and some of the reasons for my belief that success would attend us if we attacked those problems in a concerted manner.

Apart from the accentuation of population difficulties produced by war (and these are obviously not negligible), many nations (which like our own are not reproducing at maintenance level) are being faced with the economic problem, due to the lengthening of the expectation of life, that larger numbers of older people must now be provided for by the earnings of a decreasing number of people of producing age.

One of our great needs, then, is the raising of our birth rate, so as to bring about an increase in the numbers of our producing citizens to share in this increasing burden. Yet our legislators have penalized fecundity by their institution of the basic wage. This is calculated on the theoretical requirements of a family of man and wife and three children. It is obvious that this offers a premium to wage earners to have less than three children, while providing a progressive economic burden upon those who have more than that number. We must see to it that a more statesmanlike view is taken which will apportion the premium and the burdens in such a way that the fecund are given economic aid instead of being forced into poverty by their fruitfulness.

I contend that the chief prerequisite for numerical increase is the production of a generation racially healthy because it has been generated and nurtured in health; but this economic problem must be faced and solved if fecundity is to be freed.

Someone may ask whether it is not the intrusion of knowledge and conscious control which has brought about the greater part of the birth rate decline, and also whether it is not true that it is the undesirable and improvident parents who most often raise large families. I have come to believe that the fall in the birth rate is indeed due in considerable degree to the fact that we are becoming conscious of our responsibility in regard to reproduction. The desire for parenthood, which is common to all physically and mentally normal members of our race, is not a vein of power which has become exhausted, nor does this voluntary reduction of progeny among our thinking people indicate a decrease in the readiness of parents to sacrifice themselves for their offspring. The impulses of progenitive instinct are being directed, as we feel our way towards conscious and responsible creation, in uninformed and tentative paths; they cry aloud for scientific guidance and will yield to direction if we, who should be their guides, take on our proper function.

The days are surely passing when, obeying uncontrolled instinct or the authority of religion, human kind will blindly "be fruitful and multiply and replenish the earth".

The age of knowledge and understanding has begun; man is taking his first faltering steps in a rational approach to his personal responsibility in parenthood, and who are we to wish back the hands of the clock?

He is, in harmony with the march of time and obedient to an inward mentor, refusing any longer to be moved by fear of a future hell, or hope of a reward in some other life. But while he is turning from the churches he still needs guidance, and in default of a lead from us will go on with his ignorant experimentations, aided by the advertising manufacturer of contraceptives and reckless of the meaning of the birth rate.

We may as well face it. There is a vital need for scientifically informed and boldly authoritative medical leadership in the crisis which is upon us. I can see no way in which order can be brought into our present reproductive jungle short of what I last year advocated before this Branch. Society needs a unified, didactic medical service, set to build personal and racial health instead of merely to cure illness. It will not get what it needs if we leave politicians to block the roads of progress with some so-called health insurance scheme.

We can no longer excuse ourselves with the old cry: "What is the use of trying? Human nature never changes." Human nature is changing before our very eyes. None the less, its essential virility, its will to spend itself for the race is still there. It is only its habits which are in a state of flux. Man has come adrift from his old moorings and is appealing to science for new ones. For him we stand as knowing and understanding his mental and physical life, and unless we meet his needs with something more than a bottle of bromide, the gap between us will widen.

Science is proving that the health and quality of offspring can be brought to a growing extent under the personal influence of the parents; that many of the defects of children can be prevented by actions which are within the power of ordinary healthy citizens—indeed, that many of such defects are not due to some malign chance before which humans must bow like helpless puppets of fate, but are traceable to known and removable causes.

The widening of this knowledge by research and its full application will undoubtedly prove to be the way to the ultimate and complete domination of the world by mankind. It will enable us to align ourselves with the laws of natural evolution, to harness those forces which govern and develop man himself as distinct from his environment. The last few decades have seen a revolution brought about in our world through the discovery and organization of steam and electrical power. Man's genius has mastered many of the problems of the breeding of plants and animals to suit his convenience. The time has come for him to take himself in hand. He must be helped to free himself from the paralysing ideas that man was created perfect, and that his defects are due to an ineradicable inheritance of "original sin", which must be thought of as an inevitable condition of his existence. We must teach him that he is the witness and battleground of an as yet incomplete evolutionary creation. More than that, he must learn that the perfecting of the creative process in him literally awaits his own active and intelligent cooperation; that until he realizes it to be his destiny to take a growing share in the future development of his race, the unfolding of the design will be delayed.

There seems to be no doubt that the genius of Freud and Jung has begun to uncover, in what we call the primordial unconscious, the receptacle in which the energy and pattern of man's future unfolding are packed, and which like a plaque of radium is eternally projecting its emanations outwards, seeking expression in something more than the tenuous realms of thought. By another and even more mysterious alchemy, these designs are impressed upon and transmitted by the chromosomes of our germ and sperm, so that these agglomerations of genes are carrying, implicit in their tiny folds, the imprisoned future of man's history.

Is it not our duty and our privilege to spread among our people the understanding which has been given us of this potent guest which is carried in the bodies of each successive generation of mankind? Can we doubt that our evolution will be hastened in a hitherto extraordinary degree when we take an intelligent part in the creation of each generation? It is not too soon to make this proposal. Human nature needs no fundamental change for the adoption of this plan, for deep in every healthy mind is already laid the germ, awaiting its conception. All the powers of our virility and our instinct of self preservation are prepared to energize it. It awaits only the call of authority and the sanction of society to bring it into effective operation.

Utopias, "Erewhons" and "Brave New Worlds" have been and are being pictured and thought out repeatedly. Mankind, perhaps hardly yet aware, is none the less pregnant with this simple but stupendous idea, and it is enshrined, not only in our physiology and our psychology, but in more than one of the great religions of our world.

I refer to the concept, widely revered in Catholic and Buddhist religions, and revered by me who am neither Catholic nor Buddhist, of the Immaculate Conception.

This seed of human thought is destined, when the soil is adequately cultivated, so to grow in human life that all men labour to make every conception faultless.

Year by year, almost day by day even, we are seeing the miracles and prophecies of the past brought into the ordinary life we live. Prometheus and his followers have shown us the way. By their inspired thefts and courageous daring we are being made free of the riches of "the gods". It will not be long before we see that in addition to all these rewards of exploration, experiment and inspired enterprise, there remains a greater prize for our winning. We shall be one step nearer our goal when we understand that there is a part of our own evolution left for us to bring to its perfection. No longer must we allow anything to rob us of our share in the work of creation.

We have been given the picture, and it remains for us to bring it into the actual. Religion, poetry, art, science, all are fingerposts telling us in parable, poem, picture and invention that our progress was foreordained, and that we are only fulfilling our destiny when we reach out after new worlds to conquer.

Conclusion.

I therefore appeal to you to grasp this vital problem as the particular emergency of our generation and our own responsibility as its physicians. Let us implement our conviction that our racial problem demands the immediate institution of preventive medicine as our chosen method of tackling that emergency.

We in this State can do this by organizing a professionally owned cooperative medical service, such as has been working successfully in Ontario and in Oklahoma for several years. Ontario Medical Services Incorporated is described in supplements to *The British Medical Journal* of December 23 and 30, 1939, at pages 245 and 250 respectively. I shall have failed in my purpose if I have not proved to you that this is not only the best, but the only safe course for us to follow as servants of the Hippocratic oath and of humanity.

THE ESTIMATION OF THE ISO-AGGLUTININ TITRE OF HUMAN SERUM, AND ITS PRACTICAL APPLICATIONS.[1]

By LUCY M. BRYCE and RACHEL JAKOBOWICZ,
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IT has long been recognized that if mistakes are to be avoided in the determination of the blood group of hitherto unclassified red cells, potent iso-agglutinating serum must be used. Many authorities, however, discuss potency in general terms, as a qualitative attribute of such serum, without reference to actual quantitative titre. In large hospital laboratories, where numerous pre-transfusion tests are performed, there are usually facilities for frequent control tests of the serum used, and for preliminary "cross-matching" of the blood of individual recipients with that of prospective donors. In such circumstances, knowledge of the quantitative titre of the serum used does not appear to be of immediate practical importance.

During the last ten or fifteen years, however, as a result of the increasingly widespread use of blood transfusion and the collateral organization of donor services, there has been a growing demand that suitable serum for blood group tests be made generally available. This demand has been intensified recently by the need for very large amounts of serum for the testing of potential donors for war emergencies, and in this country, also for the blood group tests which form part of the routine examination of the Australian Imperial Force and the Royal Australian Air Force.

It therefore seemed advisable to attempt to formulate standards by which we could assess the suitability of serum for testing, and so could reserve for this purpose those among the donors of the Red Cross Transfusion Service whose serum was found suitable.

Estimation of the iso-agglutinin tire of the serum of all voluntary donors of the service was therefore commenced in May, 1939, in anticipation of a possible war emergency. During the first few months, an attempt was made to carry out this work by voluntary effort, and in this one of us (L.M.B.) had the cooperation of workers in several laboratories, among whom we particularly wish to thank Dr. H. Gardner, Dr. M. Avery, Miss M. Freeman and Miss P. Rountree. The amount of work involved, however, in testing with the necessary expedition the large numbers of donors who were enrolling, was more than these workers, already in full-time positions, could be asked to do. The Red Cross Society therefore appointed Dr. Dorothy Gepp, and after her resignation one of us (R.J.), to assist in this work, for which facilities were granted at the Walter and Eliza Hall Institute.

From May, 1939, till January, 1940, these workers examined 1,219 specimens of serum, the iso-agglutinin titres of which were found to range from less than 10 to 500. This cooperative work was of great value, in that it enabled us to select quickly a batch of donors with high titre serum which was needed in considerable quantities at that time. The inevitability of slight individual differences in technique and assessment of titre, and the possibility of variation in the sensitivity of the red cells used, make it probable, however, that these earlier results were not sufficiently standardized to be strictly comparable. We have therefore tabulated (see Table II) only the figures obtained since serum titre estimations have been carried out solely by one of us (R.J.), from February, 1940, onwards.

Estimation of Iso-Agglutinin Titre.

The estimation of iso-agglutinin titre was carried out as follows:

The serum to be tested is allowed to remain overnight in the refrigerator in contact with the clot of its own blood. This procedure and removal of the serum from the clot immediately after withdrawal from the refrigerator reduce the likelihood of the presence of cold agglutinins which are absorbed by the red cells at temperatures of 0° to 5° C.

The cells used in titration of the serum are obtained from members of the laboratory staff. The required amount of blood is mixed immediately after withdrawal with approximately equal parts of 2% sodium citrate in normal saline solution. The mixture is then spun, washed once and finally suspended in normal saline solution in the concentration required, and used on the day of withdrawal.

Preliminary titration tests are made on all specimens of serum in 1 in 10 dilutions in normal saline solution. These tests are made by mixing on "army tiles" eight drops of normal saline solution and one drop each of undiluted serum and a 5% suspension of red cells of appropriate group.

The stronger and more quickly occurring agglutination reactions are recorded as "+++" and "++"; those just visible to the naked eye are recorded as "+"; and those visible, after half an hour at room temperature, only with a hand lens or microscope, are recorded as "±". In these and all other titrations recorded in this paper, the reciprocal of the dilution of serum in which agglutination regarded as "+" occurs is taken as the titre of the serum. Except in the preliminary tests, readings for titre estimations are taken after two hours at room temperature.

Serum which fails to give "+" agglutination in a 1/10 dilution is retested undiluted. That which gives the stronger readings is subjected to further tests in higher dilutions. Experience with the speed and strength of agglutination in the preliminary tests has usually enabled us to gauge the range of dilutions likely to include the end-point. For these titrations it has been found convenient to mix the appropriate number of drops of saline solution, serum and red cells in tubes, and after two hours at room temperature, to transfer the material to "army tiles" to facilitate estimation of the amount of agglutination present. An example of the tests as set up for dilutions of serum ranging from 1/20 to 1/120 is shown in Table I.

TABLE I.
Method of Titration for Iso-agglutinin Titre.

Final Dilution of Serum.	1/20	1/40	1/60	1/80	1/100	1/120
Drops or volumes of:						
Normal saline solution	2	2	3	2	3	4
Serum diluted 1/10 ..	3	—	—	—	—	—
Serum diluted 1/20 ..	—	3	2	1	1	1
Red cells (3% suspension)	1	1	1	1	1	1
Final dilution of red cells	0·5%	0·5%	0·5%	0·75%	0·6%	0·5%

The "army tiles" to which reference is made above were designed by Major I. J. Wood and Major C. Wallace Ross. We are indebted to the latter for permission to publish a description of these tiles, which we incorporate with notes on their use in blood group tests in the appendix to this paper. Although the tiles were primarily designed to facilitate the performance of blood group tests on the large scale (of the order of 500 to 1,000 tests at one session) necessary for army purposes, they can readily be adapted for use in the estimation of serum titres. By the use of several tiles, accurate comparison of the reactions of a considerable number of specimens of serum is rendered very easy and satisfactory.

Results.

The iso-agglutination titre of 1,597 specimens of serum examined since February, 1940, is shown in Table II. The titres obtained are on the whole lower than those reported by the majority of workers. Thus Kettel in 1930,[(1)] and Schiff and Mendlowicz in 1926,[(2)] obtained titres as high as 2,048, and about 70% of all specimens of serum tested by the latter authors (comprising 118 of group O blood, 68 of group A and 34 of group B) agglutinated in a dilution

[1] From the Walter and Eliza Hall Research Institute, Royal Melbourne Hospital, and the Blood Transfusion Service of the Victorian Division of the Australian Red Cross Society. Published with the approval of Major-General R. M. Downes, Director-General of Medical Services.

of 1/128 or more. Lattes states (without giving actual figures) that Bais and Verhoef[6] found that the agglutinating titre of the serum of Malayan natives of the Dutch East Indies was much higher than that of Europeans.

We cannot offer any explanation of these differences, as some of the original articles are not available here, and in others the technique is not very fully described. Brewer,[9] however, in 1937, found among members of the London Red Cross Transfusion Service that the anti-A titre ranged from 0 to 800, and the anti-B from 0 to 400. Brewer's technique was essentially similar to ours, and as will be seen from Table II, his results are also of the same order.

TABLE II.

Iso-Agglutinin Titre.

Dilution of Serum.	Anti-A Agglutinins.		Anti-B Agglutinins.	
	Group B Blood. (Percentage.)	Group O Blood. (Percentage.)	Group A Blood. (Percentage.)	Group O Blood. (Percentage.)
0	0	0·3	0	0
< 10	4·5	2·0	9·8	3·2
10 to 40 ..	42·2	28·5	56·5	57·1
60 to 80 ..	29·7	38·1	24·1	29·6
100	7·3	13·6	3·3	2·7
120 to 180 ..	8·4	12·6	4·2	5·3
200 to 300 ..	6·7	4·4	2·0	2·0
300 to 1000 ..	1·1	0·6	0·1	0·1
Total number tested	178	712	707	712

Variation in Sensitivity of Red Cells.

The question whether such sensitivity plays a part in determining the titre of serum has also been considered by a number of investigators. Early work by Schiff and Huebner[10] indicated that one sample of anti-A serum agglutinated some cells only in a dilution of 1/25, while others were agglutinated by it when diluted 1/800. Lattes considers, however, that later work by Thomsen and Kettel[11] and Brahn and Schiff[7] is more accurate. The conclusions drawn from these papers are that the majority of red cells are of medium sensitivity, 12% are extremely sensitive, and 2% are very slightly sensitive. Lattes[3] also mentions reports of several Continental workers, whose observations apparently led them to suggest that the agglutinability of the red cells might undergo temporary variation as a result of disease, fatigue, pregnancy, galvanization, diathermy or vagotropic drugs.

Wiener describes some work by Kemp[2] which indicates that the agglutinability of the red cells commences early in ante-natal life, being detected in one instance in a 37-day fœtus. Kemp found, however, that the sensitivity of the cells to agglutination was only slight at such early periods, but gradually increased during the first twenty years of life, after which it remained constant. Similar findings are recorded by Thomsen and Kettel.[11]

In reviewing the question of the sensitivity of the red cells Wiener[3] sums up in the following statement: "In general, the sensitivity to agglutination of all adult cells within the same group is the same, except in the case of the group AB, and a certain percentage of group A bloods." The last phrase refers to the differences which can be demonstrated between the subgroups A_1 and A_2, a subject which is also discussed by Taylor and his associates.[12]

Many workers have observed variation in sensitivity of cells during storage *in vitro*, and Wiener[4] is especially insistent that all tests should be performed with fresh cells.

Our own work has been concerned mainly with the blood of persons in normal health, and we have made no investigations on the possible effect on the sensitivity of red cells of such conditions as disease, fatigue, pregnancy or various forms of therapeusis. Unfortunately, the majority of the papers quoted by Lattes and those of Kemp and Kettel quoted by Wiener are not accessible to us. We cannot therefore decide whether or not the variable results cited are attributable to imperfections in technique, and in the earlier work to non-recognition of the subgroups. Our data, however, support the opinion of Wiener. An example of our findings in regard to the sensitivity of red cells is given in Table III, in which it is shown that in eight out of nine samples of group B cells (none of which had been kept for more than twenty-four hours *in vitro*) tested with the same anti-B serum, the sensitivity was identical, while in one (number 9) it was only slightly greater than in the remainder. For anti-B titre estimations we have therefore used cells known to be of similar sensitivity from one or other of several adults. For anti-A serum, the results recorded are those obtained with cells of subgroup A_1, but all specimens of serum found to have high titres with these cells have been tested also with cells of subgroup A_2.

Discussion.

The iso-agglutination titre of human serum may be considered from the practical aspect, in relation to several factors.

Suitability for Use in Blood Group Tests.

We have selected a titre of 100 as the minimum suitable for testing serum. It may be asked why such a high

TABLE III.

Sensitivity of Red Cells.

Time of Reading.	Samples of B Cells.	Dilution of Anti-B Serum.					
		1/4	1/8	1/16	1/32	1/64	1/128
5 minutes.	Numbers 1 to 9.			No agglutination observed.			
10 minutes.	Number 3. Numbers 1, 2, 4 to 9.	± +	± +				
15 minutes.	Number 4. Number 1. Numbers 2, 3, 5 to 9.	+ + +	± + +	± + +			
30 minutes.	Numbers 1 to 8. Number 9.	++ ++	++ ++	+ +	+ +	±	
45 minutes.	Numbers 1 to 4. Numbers 5 to 8. Number 9.	+++ +++ +++	++ ++ +++	++ ++ ++	+ + ++	± + +	
60 minutes.	Numbers 1 to 8. Number 9.	+++ +++	+++ +++	++ ++	++ ++	+ ++	
90 minutes. 120 minutes.	Numbers 1 to 8. Number 9.	+++ +++	+++ +++	+++ +++	++ +++	+ ++	± +

titre was chosen when serum of considerably lower titre will cause definite agglutination when used in the dilution 1/2, which is possible in blood group tests. Some reasons which support our choice are as follows:

Maintenance of Potency.—Although experiments by Dr. Morgan and Mr. Graydon at the Commonwealth Serum Laboratories[13] indicate that serum stored in sealed ampoules at refrigerator temperature has maintained its potency for periods up to eighteen months, Brewer[9] has shown that even serum with an original titre of 100 or more loses the greater part of its agglutinating power after six months' storage at room temperature. Since the testing serum prepared at the Commonwealth Serum Laboratories from Red Cross donors is for general distribution, it is not possible to control the temperature at which it will be stored or the length of time for which it will be kept after dispatch from the laboratories. As great a margin of safety as possible is therefore advisable, and the use of donors with serum titre even higher than 100 would be preferable. But, as illustrated in Table IV, selection of even this figure may involve the examination of many hundreds of donors, and restriction to donors of higher serum titre would probably render impracticable the preparation of testing serum from human sources in amounts adequate for present needs. Whether the preparation of suitably absorbed immune serum from animals would be as practicable and satisfactory is a matter for consideration.

Rapidity of Agglutination.—Our experience has indicated that, in general, high titre serum when used undiluted will cause much more rapid appearance of easily recognizable clumping of the red cells than will weaker serum similarly undiluted. It will also cause readily visible agglutination of more concentrated suspensions of red cells than will weaker serum. This factor makes for safety in serum, such as that prepared at the Commonwealth Serum Laboratories, which may come to be used by relatively inexperienced workers; in our experience such workers often tend to use unsuitably thick suspensions of red cells. The excess of cells present in such suspensions may, especially if the serum is weak, absorb the agglutinins without the production of readily recognizable agglutination.

TABLE IV.

Blood Groups of the Australian Population (based on an Examination of 36,697 Members of the Defence Forces).[1]

Group.	Percentage in Each Group.	Percentage of Each Group with Titre of 100 or More.	Percentage of Population with Titre of 100 or More.
AB	2·81	—	—
A	39·49	β^2: 9·6	β: 9·6
B	9·46	α^2: 23·5	α: 2·2
O	48·24	α: 31·2 β: 10·1	α: 14·9 β: 4·9

[1] One cubic centimetre of serum is sufficient for ten tests on "army tiles". The average yield of serum per donor is 200 cubic centimetres. Therefore the serum from each donor is sufficient for 2,000 tests; for 20,000 tests (one division of the Australian Imperial Force) ten donors of each group A, B and O will be needed. To obtain this number of donors with a titre of 100 or more, it may be necessary to test for Group A approximately 260 persons, for Group B approximately 450 persons, and for Group O approximately 200 persons.

[2] α = Anti-A titre. β = Anti-B titre.

Detection of Subgroups of Groups AB and A.—It may be stated that, as a general rule, anti-A serum of titre which is high when tested with cells of subgroup A_1 is more likely to agglutinate the less sensitive cells of subgroup A_2 than that of lower titre. The relationship between the agglutination titre in respect of A_1 and A_2 cells is not, however, absolutely regular. The variations we have obtained, and, for comparison, a series recorded by Friedenreich,[14] are shown in Table V. These results indicate that although it is customary in many laboratories to use so-called "standard A_1" cells for the titration of anti-A serum, an additional safeguard would be provided by the titration with A_2 cells of all serum which it is proposed to issue as suitable for blood group tests.

TABLE V.

Titre of Anti-A Serum with A_1 and A_2 Cells.

Serum.	Cells.	Serum Dilution. 1/2	1/4	1/8	1/16	1/32	1/64	1/128
F.1029[1]	A_1	+++	+++	+++	+++	++(+)	++	+
	A_2	+++	+++	+++	+++	++(+)	++	+
F.825	A_1	+++	++	++	++	+(+)	+	+
	A_2	++(+)	++	++	+(+)	+	(+)	0
F.805	A_1	+++	++(+)	++	+(+)	+	+	(+)
	A_2	+(+)	+	(+)	0			
F.830	A_1	++	+(+)	+	+			
	A_2	+(+)	+	(+)	0			
F.818	A_1	+(+)	+	+	(+)			
	A_2	(+)	0					
J.1[2]	A_1		+++	+++	++	++	++	+
	A_2		+++	+++	++	+	+	0
J.2	A_1		+++	+++	+++	++	++	+
	A_2		+++	++	++	+	0	
J.3	A_1		+++	+++	+++	++	+	
	A_2		+++	++	++	+	+	
J.4	A_1		+++	+++	++	++	+	
	A_2		++	+	+	±	0	
J.5	A_1		+++	+++	+++	++	+	
	A_2		+++	++	+	0		
J.6	A_1		+++	+++	++	+	+	
	A_2		++	+	0			
J.7	A_1		+++	+++	++	+		
	A_2		+++	++	+	0		
J.8	A_1		+++	+++	++	+		
	A_2		+++	+	0			

[1] F = Results recorded by Friedenreich.[14]

[2] J = Results obtained by one of us (R.J.).

Provision of "Universal Donor" (Group O) Blood in Blood Banks.

The blood stored in a bank is essentially and primarily for use in urgent emergencies. It is just in such cases that preliminary determination of the recipient's blood group and compatibility tests may, perhaps justifiably, be omitted, and reliance placed on the use of stored blood from a so-called "universal donor". We have discussed more fully in another paper[13] the possible dangers in the use of group O blood for recipients of the other groups. One of these dangers is that if the group O blood has a high agglutinating titre, it may in certain circumstances cause a harmful reaction in the recipient.

By estimation of the serum titre of the Red Cross donors, who are the source of supply for the blood bank at the Walter and Eliza Hall Institute, we are able to ensure that in group O only those of suitably low titre are called for this purpose.

Similar considerations would apply to the use of "universal donors" for individual transfusions; but when a blood bank is available for use in the most urgent cases, it is less justifiable to omit preliminary tests in individual transfusions, and it is our practice therefore to urge in such cases the use of donors of the same group as the recipient.

Provision of Pooled Serum or Plasma.

We have discussed the significance of the agglutinin titre of these products in the papers referred to above,[13] in which it has been suggested that suitable mixtures of serum or plasma of the different groups will result in great reduction in the agglutinin titre of the pooled product with possible advantageous results to the recipients. Before this we had attempted to use only donors with low agglutinin titre for the provision of pooled serum. Such donors are, however, relatively few in number, so that the problem of meeting the present-day demand of large quantities of serum for military use would have become acute if we had not been able to show that if serum is pooled in suitable mixtures of the different groups it is not necessary to use only donors with very low titre serum.

Summary.

1. The range of the iso-agglutinin titre in 2,816 donors of the Blood Transfusion Service of the Victorian Division of the Australian Red Cross Society is described.

2. The practical value of the estimation of iso-agglutinin titre is discussed in relation to (*a*) provision of suitable serum for blood group tests, (*b*) provision of suitable "universal donors" for urgent calls for stored blood from a blood bank, (*c*) reduction of agglutinating titre of pooled serum or plasma.

Appendix.

The "army tiles" are made of moulded and glazed porcelain. They are rectangular in shape, measuring 11·8 by 17·5 centimetres. The upper surface is divided, by means of raised ridges, into 24 squares of equal size, disposed in 6 rows of 4. In the centre of each square is a depression, cylindrical in section, the diameter of which is 1·2 centimetres and the depth 0·3 centimetre.

Wooden frames are provided, which have mouldings on three sides; through the open space on the fourth (one of the longer sides) the tile may be inserted. It is held in position by grooves in the two shorter sides. These frames facilitate handling, shaking and storing of the tiles. A ribbon of adhesive tape may be attached to the flat upper surface of the moulding on one side, onto and from which labels may be quickly fixed and removed.

It has been the practice, in the performance of blood group tests at the Walter and Eliza Hall Institute, to use each tile for testing six specimens of blood, placing serum of groups A, B and O respectively from left to right in three of the four depressions in each row. The fourth depression is as a rule not used, but is available as a "spare" if repetition of any test is considered necessary. We understand that in some centres, where only serum of groups A and B is used, twelve specimens of blood are tested on each tile. We recognize, of course, that the use of group O serum is not essential, but after much experience of blood group tests with and without it, have come to consider that it provides such a satisfactory additional safeguard that we should not willingly relinquish our practice of using it.

It has been found that the optimum amount of fluid to fill each depression is about 0·2 cubic centimetre. We therefore advise that as a general rule 0·1 cubic centimetre of serum and 0·1 cubic centimetre of a 1% suspension of red cells be used for each test. The concentration of the blood in the samples received for the army tests often varies considerably, however, so that it may be necessary to control the concentration of the red cells. This may be done either by regulation of the size of the drop with a pipette and subsequent adjustment of the volume in the depression by the addition of saline solution, or by preliminary dilution (or more rarely, concentration) of the blood sample before the test is performed.

Mixing of the serum and red cells in the depressions is affected by a rotary movement in the horizontal plane of the tile held in its wooden frame. This is done immediately the series of six tests on each tile is completed, at least once again after about fifteen minutes, and finally just before the result is recorded.

Our experience has shown that (as illustrated in Table III) agglutination occurs more slowly in the depressions on these tiles than it does on flat glass slides, or in tubes, particularly if the latter are conical, or if they are centrifugalized. It is therefore essential in tests done on "army tiles" to allow at least half an hour to elapse before the results are recorded. When large numbers of tests are to be performed, this time lag is not a great disadvantage. We have found that there is very little tendency for drying sufficient to interfere with the tests to occur within the first hour or so, except on very hot dry days, when the stacks of tiles waiting to be read may be easily covered with a damp cloth. A worker of reasonable speed can accomplish 80 to 100 tests in an hour. Our practice is, therefore, to fill and set aside, except for occasional shaking, six or eight tiles, which are easily stacked in a compact pile, while completing a second similar series. The results of the first series are then recorded on the labels attached to the frames. The readings are made macroscopically, with confirmation with a hand lens if thought necessary. The tiles are then passed on to an independent observer, who checks both the results and the recording thereof. It is thus seldom less, and usually more, than three-quarters of an hour before the final readings are made. We have found that at the end of such a period there is scarcely ever any doubt as to whether or not agglutination has occurred, the clumps of cells almost always being very large, discrete and definite, and the unagglutinated blood still smoothly homogeneous.

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THE TREATMENT OF FIBROSITIS AND ALLIED DISORDERS BY LOCAL ANÆSTHESIA.

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THE observations of Lewis and Kellgren (1938, 1939) may well prove to mark a turning-point in the history of medical research, for they represent the first attempt to investigate scientifically the nature of pain. In the past pain has been accepted as a symptom, and we have heard much discussion of the differences in quality between the pains from different organs, as, for instance, the difference between angina and biliary colic.

The currently accepted views upon pain are those of Morley (1931). Pain may be of three types: (i) visceral, (ii) somatic and (iii) cutaneous. (i) Pain originates in viscera which are insensitive to ordinary stimuli. The pain is poorly localized. (ii) Certain somatic structures, such as the parietal portion of the peritoneum and the periosteum, are sensitive. The pain is fairly accurately localized. Other structures, normally insensitive, become sensitive when they are the subject of disease such as inflammation. (iii) The end-organs and pathways of conduction of cutaneous pain have been studied, and the findings are generally accepted as applying also to somatic pain.

Visceral pain is due as a rule to colic, or to contraction of smooth muscle. Occasionally ischæmia is the cause, as in *angina pectoris*. Somatic pain is due in the majority of cases to tissue injury, either traumatic or inflammatory. In others the cause is mechanical, as in certain affections of the joints, and in pressure on nerves. In other cases again the cause is unknown, and is vaguely thought to be some affection of the nerves. These cases are labelled "neuralgia".

In all these instances we regard the final cause of the pain as pressure on or injury to nerve fibres. Somatic pain is accurately localized, but visceral pain is referred to certain areas of the body, and is often associated with muscular rigidity and with hyperalgesia of the skin. Certain joints, as the hip and shoulder, may be the origin of referred pain. Pains which shoot down a limb are due to affections of nerve trunks.

The Work of Lewis and Kellgren.

The careful studies of Lewis (1938) have proved that the essential quality of cutaneous pain does not vary; that, no matter what the painful stimulus applied, the pain is felt as "pricking" if of brief duration, and as "burning" if prolonged. Lewis proved also that the pain from muscles and tendons differed entirely in quality from cutaneous pain—so much so that the two types of pain should be called by different names.

Kellgren (1938, 1939) later proved that somatic pain, no matter from what structure it arises, does not differ in quality from visceral pain. Thus an injection of hypertonic saline solution into the *rectus abdominis* causes pain exactly like intestinal colic. Pain from the deeper somatic structures is referred to a distance, and deep tenderness may be found in the area to which the pain is referred. Many of the phenomena which are known to accompany visceral disease, such as hyperæsthesia of the skin and muscular rigidity, may accompany deep somatic lesions produced experimentally. Pain from more superficial somatic structures, such as periosteum or fascia situated subcutaneously, is more accurately localized. Muscular tissue is insensitive to perforation with a fine needle, but it gives rise to pain if it is injured by the injection of small amounts of hypertonic saline solution. Fasciæ, tendons and periosteum give rise to pain when they are pricked with the needle-point. Articular cartilage is insensitive to all forms of stimuli.

The conclusion of Lewis and Kellgren is that the cutaneous pain nerves belong to a system entirely separate from the nerves to the deeper structures, and that the deep somatic and certain visceral structures are supplied by a common set of afferent nerves, stimulation of which causes similar pain and similar reflex phenomena.

In investigating referred pain from muscle, Kellgren produced intramuscular lesions with hypertonic saline solution, and mapped out the resulting areas of referred pain and tenderness. It occurred to him that the symptoms closely resembled those of fibrositis, and he was led to study some cases of this complaint with local anæsthesia. He was able to demonstrate with certainty that the widespread pain and tenderness of fibrositis were often due to a single painful intramuscular nodule, anæsthetization of which would abolish not only the referred pain, but also the widespread tenderness.

The earlier work of Lewis (1937) on the nocifensor reflex provides the probable explanation of these phenomena. He showed that a spreading area of hyperalgesia and hyperæmia soon surrounded a point of injury to the skin; this occurred through the agency of an axone-reflex. Similarly, antidromic stimulation of a sensory nerve produced vaso-dilatation and hyperalgesia. In predisposed subjects the hyperæmia might proceed to wheal and bleb formation (as in *herpes zoster*). Lewis likened the appearance of hyperalgesia to a process of secretion; some substance was liberated by the cells which lowered the threshold of the pain nerves.

Similarly, a painful focus in a muscle should set up by reflex action a deep zone of hyperalgesia, accompanied by hyperæmia, and in extreme cases perhaps by œdema. It is well known that the œdema of a sprained joint is reflex in origin. Leriche and others have shown that the early anæsthetization of the ruptured capsular fibres delays the onset of swelling and widespread tenderness. Arguing by analogy, it therefore should not be surprising to find œdema as an occasional concomitant of pain and tenderness referred from a muscular lesion.

Fibrositis.

The general practitioner who wishes to study the nature of fibrositis is well situated with a view to making accurate observations upon this common complaint, for he is provided with an instrument of great scientific precision in local anæsthesia. Since the appearance of the first works of Kellgren I have investigated with local anæsthesia a very large number of patients who complained of pain. During the early stages I concentrated on the simpler cases of obvious somatic pain (or fibrositis). Later my investigations were extended to include pain in the region of joints, with or without obvious manifestations of arthritis. Many cases of pain which appeared to be visceral in origin proved upon investigation to be due to somatic lesions. Positive results in some 200 cases of somatic pain during the past two years have confirmed for me and amplified the discoveries of Kellgren. I have established certain conclusions regarding the nature of fibrositis in general, and recorded special observations regarding certain areas in the body. Before firm conclusions can be drawn, however, many further accurate observations will be necessary.

General Conclusions.

In the majority of cases of fibrositis the offending lesion is a nodule situated in muscular tissue, which can be recognized by palpation as such, or as a strictly localized area of deep tenderness if more deeply placed. This nodule causes widely distributed referred pain, frequently associated with referred tenderness, and sometimes with subcutaneous œdema. One must be careful to distinguish the tenderness of the lesion, which is localized and acute, from the referred tenderness, which is widely diffused and less acute (though it may be acute over bony points).

Pain, swelling and tenderness do not necessarily appear with proportionate intensity. In some instances, when the pain is severe there may be little or no tenderness. This is especially the case when the pain is referred to the region of a joint, and corresponds with the experimental findings of Kellgren. Swelling is seen more frequently when the subcutaneous tissues are lax.

The intensity of the pain of fibrositis varies between a mild ache and an acute paralysing pain, with spasm of the neighbouring muscles. The pain is worse on movement, but in many it is felt also when at rest. In some instances it is worst after the patient rises, and eases off

during the day. Fibrositis in all situations tends to wax and wane, with a gradual tendency to cure in weeks, months or years.

The onset is spontaneous in the majority of cases, but in many it follows trauma or a muscular effort. When it follows a muscular effort, there is often a period of several days between the injury and the acute exacerbation of pain. Fibrositis is especially common in pregnancy, and often follows infections, such as influenza or German measles. A remarkable characteristic is the tendency for metastatic lesions to appear in far distant muscles as the original lesion subsides. Frequently these secondary lesions are symmetrical. This occurs in both spontaneous and traumatic cases.

The vast majority of patients were treated by infiltration of the nodule with 5·0 to 15·0 cubic centimetres of "Percaine" solution (1 in 1,500). Muscular tissue is insensitive, but the penetration of the nodule causes pain. The nodule can be recognized by its tough consistency. Infiltration is almost invariably painful.

Infiltration of the nodule immediately abolishes not only the tenderness of the nodule, but the diffused pain and tenderness, and all limitation of movement. This reaction is diagnostic; if it does not occur, the nodule has not been discovered, and a further search is necessary.

In the majority of cases, if the nodule has been successfully injected, the relief of pain is permanent. After the abatement of the local anæsthesia, a "bruised" feeling appears, but it does not persist. When the nodule is very large or very tough the after-pain may be severe and prolonged (twenty-four to forty-eight hours).

In some cases, after complete abolition of the pain, it returns with greater intensity. In these the disintegration of the nodule has not been secured, or a new nodule has formed. Reinjection will usually succeed. It is important that the fluid be delivered into the centre of the nodule. A severe reaction occurs if tendon or periosteum is infiltrated, or if the injection is made into a point of referred tenderness. A temporary improvement may follow such a mistake, but careful observation will ascertain that all the symptoms have not been abolished.

Observations Relating to Special Areas.

Low Back Pain.

Pain in the lower part of the back may be severe or mild; it may be felt only on certain movements or it may be felt as a generalized ache when the patient is at rest or after he has been stooping for a time. It is usually referred by the patient to the centre of the small of the back; sometimes it shoots around to the front on the side of the lesion, or down to the buttock. In about half of my cases it arose as the result of trauma or muscular effort.

It is particularly likely to become chronic in men who do heavy work, and for them it is very incapacitating. Such patients are often found to be resentful of the treatment they receive; in our inability to trace the cause of the pain we label the patient's condition a "compensation back", and hint that he is neurotic or a "lead-swinger". The maddening reality of the continuous pain sometimes leads at length to an obsessional state of mind.

In the greater number of cases of low back pain I have been able to find a single causative nodule, infiltration of which with a 1 in 1,500 solution of "Percaine" gives immediate relief and is followed by permanent cure.

The nodule is most commonly situated in the *gluteus maximus*, close to its attachment just outside the posterior superior spine (Figure Ia). An almond-shaped nodule can be felt, tender to the touch, with its long axis in the direction of the muscle fibres. Pain may or may not be felt locally, but referred pain is always felt in the lumbar region, sometimes with referred tenderness.

The second common site for a nodule is in the *erector spinæ*, frequently at its outer edge in its lower half. This may be deeply placed and difficult to locate (Figure Ib). In a few cases the nodule was discovered in the mid-line, deeply placed betewen lower lumbar spines (Figure Ic).

The symptoms do not vary greatly with the location of the nodule. When the pain goes around to the front it sometimes causes tenderness of the anterior abdominal wall. In some cases the abdominal symptoms predominated; this led to a suspicion of visceral disease.

Of 49 cases, a nodule was discovered and successfully infiltrated in 43. In 23 of these it was situated in the gluteal attachment, in 15 in the *erector spinæ* and in five in the mid-line. Nodules were detected in the erector or the gluteus in a dozen other cases in which the only complaint was of abdominal or pelvic pain.

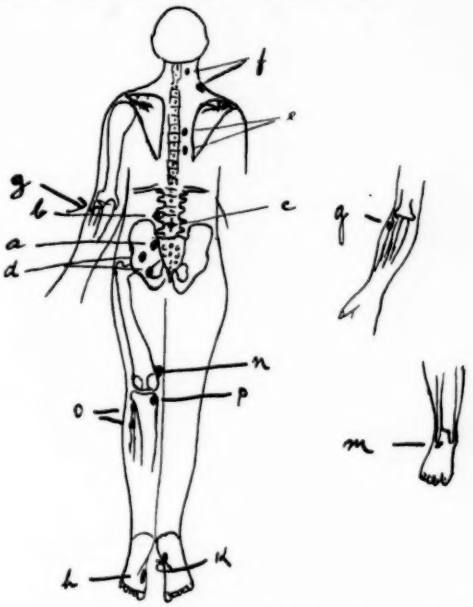

Figure I.
Common sites for nodules (see text). Inset: Anterior views of forearm and foot.

The following are some typical examples:

Case I.—A young man complained on July 16, 1940, of a "bad back" for four weeks. He had ricked it when hunting kangaroos. The pain was felt in the small of the back and shot down the left thigh; it came on when he stooped. A nodule was identified in the left gluteal attachment. No injection was given; he was instructed to massage it vigorously. A month later he returned to say that his back pain was a great deal worse. On infiltration of the nodule the pain disappeared, and so far (November 26, 1940) has not returned.

Case II.—A man, aged thirty-nine years, complained on August 24, 1940, of pain in the back of eight weeks' duration. The back ached after prolonged stooping. Pain was felt also in the right side of the abdomen.

On examination tenderness was detected along the right costal margin as far forward as the edge of the rectus. The acute tenderness of a nodule was discovered in the substance of the right *erector spinæ* at the level of the second lumbar vertebra. Infiltration abolished the pain and tenderness. Six days later he stated that a slight backache had appeared two days before. Infiltration of the nodule abolished this, and six weeks later the pain had not returned.

Case III.—The patient has suffered from pain in the back for over twenty years; he is in receipt of a military pension for the condition. Several times a year he is incapacitated for a week or more with severe lumbago; between attacks he often feels twinges of pain.

When I first saw him in March, 1940, tenderness and rigidity were present all over both loins. No lesion was found, many fruitless injections being made. He spent a week in bed. Two months later he complained of a mild attack, and he himself located the lesion in the mid-line. A deep injection between the fifth lumbar spine and the sacrum relieved the pain. After thirty-six hours of post-anæsthetic discomfort the pain again left him. Five weeks later he felt a very slight twinge; infiltration of the same spot relieved him. This happened again three weeks later. Since then (five months before this paper was written) he has had no more pain in his back.

CASE IV.—E.S., an elderly woman, who two years before had had a dermoid cyst of the left ovary removed, complained of pain in the left iliac fossa, of eight weeks' duration. It was referred mostly to the wound in the mid-line. Further questioning elicited the information that the pain went through to the back and down the left thigh. Tenderness was detected just to the left of the mid-line scar. A nodule was located posteriorly in the common gluteal situation. Infiltration immediately abolished all pain and tenderness, and two months later the patient said that the cure had been complete.

Had I seen such a patient some years ago, I should have labelled her condition "adhesions"; thus would have been born a "chronic pelvic woman".

Sciatica.

Sciatica is an intractable pain felt in the buttock which shoots down the back of the thigh. Little is known of the pathology; the underlying condition is thought to be an interstitial neuritis of the sciatic nerve. Most writers give very many causes, regarding the pain merely as a symptom.

A recent writer (1939) doubts the hypothesis of neuritis. "If one hypothesis", he states, "can be found to account for all the observed facts, it is probably the true explanation, and there is no need to postulate several disorders."

In searching for a muscular origin in sciatica, I have usually been rewarded by finding deep tenderness in the centre of the gluteal mass (Figure ID). Infiltration discloses a nodule (usually very large and tough) close to the *tuber ischii*. Post-anæsthetic pain is usually prolonged and severe.

Of twelve cases, cure was achieved in seven by the first injection; in two the pain was completely relieved for a time only; in two the nodule was found only after several attempts; and in one no nodule could be found.

The following is typical of the successful cases:

CASE V.—A woman, aged twenty-nine years, first suffered from sciatica when aged thirteen years. The present attack had lasted a year. She could not stoop or sit without pain. She also complained of "pins and needles" in the lower part of the leg. She had been treated by specialists and had had injections of saline solution into the sacral canal. Infiltration of a nodule close to the *tuber ischii* caused immediate abatement of all pain. Next day the pain was severe, and it then disappeared. Now, four months later, she complains only of "pins and needles" above the external malleolus.

Pain in the Chest.

Pain in the chest, or pleurodynia, has in many instances been proved to be of muscular origin. Tight strapping often relieves the pain and avoids any necessity for more radical treatment. In cases in which relief is not obtained by strapping, a search will usually be rewarded by the identification of a nodule.

Pain on the left side is complained of more frequently than on the right. In most cases the pain is felt wholly or mainly in the front; in about half it shoots around from the back. Pain on the left side of the chest is often accompanied by nervous distress, and in patients aged over forty years it can very closely simulate *angina pectoris* and coronary occlusion. When the nodule is situated in the intercostal muscles it often sets up an oval area of referred tenderness, with its long axis in the direction of the rib. The nodule will be found at the posterior end of this area. In cases in which the pain is referred from the back, the nodule is usually found behind the angle of the rib, deeply situated in the *erector spinæ* mass (Figure IE).

CASE VI.—A man, aged thirty years, was seen on August 11, 1939. He complained of pain around the heart of two weeks' duration. Fearing heart disease, he was in a nervous state, almost unfit for work. A tender spot was found in the fifth intercostal space, near the apex beat. Infiltration abolished the pain, which later returned with greater intensity for twelve hours. It then disappeared.

CASE VII.—A man, aged fifty-six years, collapsed with severe pain in the chest when lifting a heavy weight. He was pale, the pulse was soft, and he complained of pain and tenderness in the precordial region. Having treated him twice previously for muscle strain, I examined him carefully for tender spots. A lesion was found in the left *erector spinæ* at the level of the angle of the scapula. Infiltration relieved the pain.

On the next day he complained of pain in the back lower down, felt mostly on flexion and extension of the spine. This continued for several days. Finally, a tender spot in the left *erector spinæ*, at the level of the second lumbar vertebra, was infiltrated with lasting relief.

Pain in the Neck.

Osler and McCrae (1923) describe a headache associated with tenderness and induration in the nuchal region. M. B. Ray (1934) states that nodules are often found in the trapezius and complexus in cases of stiff neck and occipital headache. My experience is that nodules situated high up towards the occiput tend to cause headache only, while lower down the pain is often referred both to the shoulder and to the lambdoid region (Figure IF). Lesions in the neck muscles will be found sometimes to follow injuries to the head. In such a case it is a pardonable error to regard the headache as of intracranial origin.

CASE VIII.—The patient fell head first from a tree, sustaining a large scalp wound, which was sutured under local anæsthesia and healed by first intention. For the following week he complained of a severe headache, felt on the right side of his head (the wound was in the right parietal region). Eight days after the injury a purely experimental injection into a tender spot in the upper part of the right trapezius was rewarded by the sudden and complete disappearance of the headache.

Six days later he complained of a pain on the left side of the neck, shooting out to the shoulder. A lesion was detected in the trapezius, just to the left of the *vertebra prominens*, and once again injection was successful.

Pain in the Upper Extremity.

Rheumatic pain in the upper extremity is frequently referred to the joints. Pain felt in the shoulder is often accompanied by limitation of abduction. This limitation is due in early cases to pain, and in later cases to periarticular adhesions resulting from subdeltoid bursitis. An elongated nodule can often be found in the anterior fibres of the deltoid. The improvement which follows infiltration is, however, succeeded in the majority of cases by a deterioration of the condition. In several mild cases successful results have been achieved, but in the majority immobilization of the shoulder is necessary.[1]

Pain around the elbow and in the forearm may be felt only on certain movements (tennis elbow), or a continuous ache may be present. A nodule should always be sought in front of the upper end of the radius, in the extensor mass of muscles (Figure IG). Careful palpation will reveal a tender area, and in several typical cases of tennis elbow infiltration of this area has given a permanent cure. The epicondyle and extensor tendon is often found to be acutely tender, but infiltration here should be avoided, as a severe reaction will follow. This acute tenderness will disappear a short while after infiltration of the intramuscular nodule.

Several cases of so-called "neuritis", so common in pregnancy and in a recent epidemic of rubella, have been relieved by infiltration of a nodule in this region. Swelling of the hand, numbness, tingling and stiffness of the fingers—all these have been observed to disappear after a single injection.

CASE IX.—A woman, aged forty-one years, complained of pain in the hands and feet of fourteen days' duration. The condition of the feet and the left hand had improved, but she still complained of severe pain in the right shoulder, forearm and hand. The pain in the shoulder was most acute on abduction of the humerus.

On examination the forearm was found to be tender from the external condyle to the palm of the hand. An acutely tender spot was found in the extensors, and infiltration abolished all pain in the forearm and hand. The patient still complained of pain in the shoulder, shooting down the outer side of the humerus. Infiltration of two nodules in the deltoid abolished all pain and limitation of movement. Two days later the pain had not returned below the elbow, but the shoulder was much worse.

[1] More recently, encouraging results have been obtained in several cases of painful disability of the shoulder by discovering and infiltrating lesions situated deeply in or beneath the upper fibres of the trapezius, at or medial to the mid-scapular line (Figure IF). The rapid disappearance of pain and widespread tenderness has to be seen to be believed.

Foot Strain.

Foot strain comprises many painful affections of the feet. The pain may take the form of a generalized constant ache or a burning tenderness of the heel and the inner side of the foot. If felt more towards the front of the foot it is known as metatarsalgia. The pain sometimes shoots up the leg, even as high as the knee.

In many painful feet I have been able to discover nodules, while in others my efforts have been unsuccessful. My proportion of successful cases has increased since I singled out two special areas for attack, and ceased to inject haphazardly all points of acute tenderness. The two sites are as follows: (i) An elongated nodule can often be felt lying along the plantar aspect of the first metatarsal bone. This frequently causes pain in the front of the foot (Figure IH). (ii) With a tender heel, the nodule may be discovered as an acute area of deep tenderness at the topmost point of the arch in front of the heel (Figure IK).

CASE X.—A young man who had fractured his thigh could not return to work because of a pain in his foot on walking. After several weeks the foot was examined and an elongated nodule was discovered near the first metatarsal bone. Infiltration was so successful that he returned to work four days later.

In a few of my cases pain in the foot was associated with swelling of the ankle and the instep. In one such case relief was obtained by infiltration of a tender spot in the *extensor brevis digitorum* (Figure IM).

Pain in the Region of the Knee Joint.

Pain and tenderness in the knee will usually be found to be referred from nodules situated in muscles adjacent to the joint. The commonest situation is in the region of the adductor tubercle (Figure IN). An area of tenderness will be found covering the internal condyle, and points of exquisite tenderness will be found at its upper border. On infiltration of these points the tenderness of the whole internal aspect of the knee will be found to disappear as if by magic. Two other common sites are (i) the soleus just behind the neck of the fibula (Figure IO), and (ii) the inner head of the gastrocnemius (Figure IP). Nodules may also be found deeply situated in the popliteal space.

Mennell (1934, 1938) has stated that painful knees may be due solely to sensitive deposits in the calf muscles. Kellgren (1939), in his most recent contribution to *Clinical Science*, describes observations upon painful knees almost exactly similar to mine. Pain, tenderness and limitation of mobility were seen to disappear upon infiltration of nodules situated posteriorly. I have seen more than a dozen such cases.

CASE XII.—A woman, aged fifty years, had had a painful left knee for a year. A year earlier she had spent two weeks in bed because of the condition. There was limitation of both flexion and extension, and severe pain was felt when the heel was placed on the ground. The pain was felt mostly behind the knee, but the patella felt sore and insecure, as if it were "about to slip sideways". She had to walk very carefully.

On examination crepitus was detected in both knees. There was slight puffiness of the left knee, which was tender in front and behind, but especially on its inner aspect. Tapping of the patella against the femur caused pain.

Infiltration of a tender spot in the outer head of the soleus relieved all the tenderness behind the joint and partly restored mobility. But the patella still remained tender and felt insecure. Infiltration of a nodule in the region of the adductor tubercle completely abolished all tenderness in front and the feeling of insecurity, and restored all mobility. The cure was complete. Nine months later the knee remains quite well, though treatment has since been given to the right knee for a similar condition.

CASE XIII.—A man, aged seventy-two years, had been treated for painful swelling of the right knee and ankle. After six months the joints were restored to normal, when a similar condition suddenly arose in the left knee and ankle. The joint was distended with fluid, and there was much pain behind the knee. When in hospital he complained of severe cramps at night.

After a week he was treated by infiltration of two nodules, one in the soleus three inches below the head of the fibula, and the other on the inner side of the popliteal space just above the joint line. The latter was possibly in the inner head of the gastrocnemius muscle. The pain and tenderness immediately disappeared, and complete mobility was restored, even though the joint was distended with fluid. No more cramps occurred. The subsequent course was one of rapid recovery.

Nodules in Other Situations.

Nodules may be discovered in almost any situation, but they occur in the majority of cases in the positions described. In almost any case of pain of uncertain origin, a search for a muscular lesion should be made. I have seen four patients with post-herpetic neuralgia who were cured by the infiltration of fibrositic nodules. I have not found infiltration in recent injuries so successful as have some recent writers (Button, 1940; Copeman and Burt, 1940). If the disability is very great, infiltration will give immediate relief, but I find that subsequent injections have often to be given. It is now my custom to give the injured muscle a few days for natural recovery to occur. If a nodule forms, it can then be infiltrated, with good results.

Discussion.

Souttar (1923) was the first to record cure of muscular pain by local anæsthesia. The failure of the method to gain popularity was no doubt due to the impossibility of distinguishing between the referred tenderness and the tenderness of the lesion itself. More recent writers who fail to make this distinction are Steindler and Luck (1938), and Button, though their results in general go a fair way towards confirming the foregoing observations.

Mennell (1934) is certain that pain can be caused solely by sensitive deposits in muscles, though he misses their real significance and recommends their disintegration by massage. Cyriax (1938) has recently stressed the importance of rheumatic nodules in the production of headache, and Young and Cyriax (1939) have written of the value of local anæsthesia in the diagnosis of low back pain.

The observations of Copeman and Burt (1940) are almost identical with my own; but they make no attempt to explain the permanence of the cure in some cases, and the many failures.

Leriche (1939) has for many years been curing pain by local anæsthesia. The value of his observations, however, is somewhat vitiated by his continued insistence, with insufficient evidence, upon the role of the sympathetic as the great conductor of pain impulses.

The experimental work of Lewis and Kellgren has provided the key to the whole problem of muscular rheumatism; anyone who wishes to study the subject should not fail to read their contributions.

The central fact which emerges from the foregoing observations is that widespread pain and tenderness can be relieved immediately by the anæsthetization of a small focus. Even if the results were of no value therapeutically, they would still be of extreme importance as a clinical observation. The permanence of the cure in many cases will, of course, lend them additional importance.

Lewis considers that the occurrence of hyperalgesia as a nocifensor reflex is brought about by the liberation of a substance which lowers the threshold of pain nerves. The manner of its liberation could be compared with that of acetylcholine. Like acetylcholine, too, it is destroyed rapidly by the tissues, for the tenderness disappears rapidly when the reflex arc has been interrupted by the cutting off of the flow of impulses from the fibrositic lesion.

It can be seen that a great deal of research along these lines is required. Lewis and Kellgren have laid open a wide new field for research, in which the symptoms complained of every day will receive new significance, and a message of hope is conveyed to the many sufferers from unrelieved pain who daily frequent our consulting rooms and dispensaries.

Summary.

1. In the majority of cases of somatic pain the offending lesion is a nodule situated in muscular tissue, which can be recognized as a strictly localized area of acute tenderness, causing widely distributed referred pain and deep tenderness. In some cases subcutaneous œdema is caused.

In the limbs these reactions are prone to be referred to the joints.

2. Infiltration of the nodule with a local anæsthetic immediately abolishes both the acute localized tenderness and the diffused pain and tenderness. In the majority of cases the relief is permanent.

3. These observations shed a new light upon the pathology of the group of diseases known as fibrositis and allied rheumatic manifestations. Emphasis is laid upon the importance of the part played by the nocifensor nervous system in the symptomatology of rheumatism.

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Addendum.

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THE USE OF LOCAL ANÆSTHESIA IN THE RELIEF OF CHRONIC PAIN.

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PAIN, susceptible of relief by the production of local anæsthesia, is caused by conditions commonly referred to as myositis, fibromyositis, ligamentous strain, bursitis and intercostal neuralgia. All these ailments, with the occasional exception of intercostal neuralgia, are characterized by chronic pain, which may be localized, radiating or referred, and by the presence of one or more tender spots.

Technique.

The therapeutic procedure consists of complete infiltration of the tender area with a local anæsthetic, repeated puncture ("acupuncture") of the subcutaneous and deeper tissues with the injecting needle, and when anæsthesia has been obtained, thorough kneading of the affected region with the fingers. Further, the patient should perform vigorously such active movements as may be necessary to "manipulate" the part. These movements must be repeated at half-hour intervals whilst anæsthesia persists, and must subsequently be performed as vigorously as possible every four hours during the day until the patient is seen again by the medical attendant (which should be within forty-eight hours, if possible). Aspirin may be necessary in this period. It is important to warn the patient that at this stage his pain may be worse.

In some cases the pain will not return after the anæsthesia has passed off; in others (especially cases of ligamentous strain) it may be more severe for twenty-four to forty-eight hours and then gradually disappear over the next four or five days; in yet others a second or third injection may be necessary before cure is established; finally it must be recognized that 20% to 30% of patients will not be cured, but the condition of many of these may be improved.

The local anæsthetics I can recommend are "Novocain", ethocaine and procaine in 2% concentration in normal saline solution and in quantities up to 40 cubic centimetres. I have used "Decicaine" ("Pantocaine"), but have had severe reactions.

Mode of Action.

Several possibilities present themselves. In those cases in which chronic pain follows trauma (sprains and strains), the chronic condition is usually established owing to unduly long rest in the acute stage. This allows the organization (instead of absorption) of exuded serum and the formation of "painful tangles" or adhesions involving nerve endings. Treatment consists in the demolition of tangles, the production of a new acute sprain and its correct conduct. The same mechanism may pertain when chronic pain follows acute non-traumatic myositis and fibromyositis.

Alteration of the acquired local vascular conditions (caused partly by the injection and partly by the repeated puncture and the manipulation) may be an important factor in the success of the method (especially, I think, in subacromial bursitis).

Again, an original acute lesion may have produced a temporarily persistent pain which caused a "facilitation" of the pain reflex. The residual condition, although normally able to cause only subminimal stimulation, now causes pain owing to this "facilitation". "Facilitation" is abolished by the local anæsthesia and the pain vanishes.

Finally, the psychic element is undoubtedly active in some cases.

Relation of Chronic Pain to Focal Infection.

Many of these conditions, even those which are primarily traumatic, have a distinct relation to focal sepsis, especially in teeth and tonsils. By the injection treatment the pain can usually be alleviated, but should the septic focus remain recurrences are not infrequent. On the other hand, the removal of the focal sepsis as a sole measure is likely to be ineffective, requiring to be supplemented by injection treatment to complete the cure.

A More Detailed Consideration of Clinical Conditions.

Traumatic Myositis (Muscle Strain).

Traumatic myositis is common in the trapezius, the rhomboids, the sacrospinalis, the elbow region (tennis elbow) and the adductors of the thigh. The pain is frequently referred to a large area and may radiate, but careful examination discloses one or more localized tender

spots, pressure upon which produces the characteristic pain. The percentage of successes obtained in these cases is extremely high.

Chronic Sacro-Iliac and Other Ligamentous Strains.

Sacro-iliac strain is usually associated with a tender spot about the posterior superior iliac spine. This region should be deeply infiltrated with local anæsthetic; two or even three injections may be necessary. A high percentage of cures may be expected, but recurrences are not unusual and septic foci should be systematically eliminated. The manipulative exercises are most important in this type of lesion, and exacerbation of pain in the twenty-four hours following injection is common.

Chronic strain of the interspinous ligaments can usually be effectively treated; but chronic lumbo-sacral strain is apt to prove resistant, and is better treated by manipulation under general anæsthesia.

Subacromial Bursitis and Bursitis in Other Regions.

Subacromial bursitis usually embraces supraspinatus strain and attritional changes in this muscle as well as affection of the subacromial bursa (Codman's bursitis, Codman's soapy tumour). The lesion is characterized by pain on abduction and rotation of the arm (often referred to the mid-deltoid or deltoid insertion region), by tenderness immediately lateral to the acromion when the arm is by the side, and sometimes by radiographic changes in the subacromial bursa. Injection and repeated puncture under the acromion until painless movement is established are performed and followed by manipulative movements. Little additional good seems to acrue from irrigation of the bursa unless radiographic changes are definite. Good results are usual, but again, eradication of septic foci is important.

I have also had permanently successful results in one case each of chronic pain arising from the *bursa anserina* (sartorious insertion) and from the subanconeal bursa.

Chronic Non-Traumatic Myositis and Fibromyositis.

Chronic non-traumatic myositis and fibromyositis usually follow an acute infective myositis and are almost invariably in the trapezius or sacrospinalis (lumbago). A septic focus is often the basis. Pain is frequently widespread, but localized tender spots can usually be found. Results are not so good as in the traumatic variety, and if localized tender spots are not present injection should be avoided.

Intercostal Neuralgia.

Should pain along the course of an intercostal nerve be associated with a tender spot, infiltration of this region may produce relief. The tender spot is frequently at the costal margin, and thorough deep infiltration is necessary. The proportion of successes is probably not greater than 25%. Even in the absence of a tender spot, should the pain be very constant and localized, infiltration of this area is advised.

Conclusion.

In many of these conditions manipulation under general anæsthesia, although less convenient, is equally effective, and in some cases of back strain in which considerable manipulative movement is required, general anæsthesia may be preferred.

No mention is made of the use of local anæsthesia in the treatment of acute sprains, since this subject is outside the scope of this paper. It can, however, be considered as a prophylaxis against the development of these chronic pains.

Summary.

1. The use of local anæsthesia in cases of chronic pain associated with the fibromyositic and allied syndromes is described.

2. Suggestions are put forward as to the mechanism of its action.

3. Attention is drawn to the relation of septic foci and to the consideration which they should receive in the treatment of these conditions.

4. Some details are given of the special types of case in which good results are likely to follow this method of treatment.

Reports of Cases.

PROLAPSE OF A FŒTAL ARM AND ANTENATAL HÆMORRHAGE.

By MARY C. DE GARIS.

(From the Maternity Unit of the Geelong Hospital, Geelong.)

Clinical Record.

A MARRIED woman, aged thirty-eight years, who had had three children and one miscarriage, was admitted to hospital at 7.30 a.m. on October 25, 1937, as an "emergency". Labour had begun twenty-three days early. The patient had had no trouble with previous labours; she was edentulous and the menstrual periods had been painless. Her diet was fairly satisfactory.

On her admission to hospital she was suffering from hæmorrhage; no presenting part had been found when a vaginal examination was made early in labour. Uterine contractions had begun at 8 p.m. on the previous day, and the membranes had ruptured at about 11 p.m., when the contractions were recurring every five minutes; after that there was hæmorrhage unaccompanied by contractions. Examination revealed that the uterus was very hard and rounded in the greater part of its area and tender above the brim; but there was no tenderness over the fundus. The fœtal heart was heard. A vaginal examination disclosed an arm prolapsed through the cervix, which was closely gripping the arm near the shoulder. The presenting part was not driven down into the pelvis. The diagnosis of premature retraction of the uterus was made. At least three vaginal examinations were made during labour.

At 10.30 a.m. a classical operation for Cæsarean section was performed; a stiff pull on both legs was necessary to deliver the infant, owing to the resistance of the cervix. The child was a male, weighing six pounds and half an ounce; it was deeply cyanosed and its heart was beating feebly. It drew one breath, but could not be induced to do more; it was evidently dying when delivered. The placenta was not in front of the child (the membranes had required incision), but was found lying loose in the uterus after the birth of the infant, and was lifted out. The right arm of the child was very swollen up to the shoulder, and a groove was present below the shoulder where the cervix had been contracted on it. The mother's temperature on the third day was 100·4° F., and she was given some "Prontosil"; but as she became cyanosed the drug was discontinued next day. She was discharged from hospital on the thirty-first day.

Discussion.

A review of the case suggested that the child had lain in the transverse position, and that when the membranes ruptured it put its arm, bent on itself, through the partly dilated cervix; this was thought to have disturbed the contraction and retraction of the uterus. The sequence of events is thought then to have been as follows. Premature retraction set in without any further dilatation of the cervix or any expulsive contractions; the placenta, owing to the retraction, separated gradually, and this process caused the antenatal hæmorrhage. The baby was suffocated from the premature separation of the placenta, which probably completed itself during the anæsthesia. It is now believed that the Cæsarean section should have been performed immediately on the patient's admission to hospital; the possible complete separation of the placenta and the consequent danger to the infant had been overlooked.

One other problem arose at first: was this a case of tetanic contraction of the uterus, as suggested by one medical man who saw the patient? The absence of tenderness over the fundus, and the fact that the presenting part was not driven into the pelvis determined the diagnosis; moreover, the mother's general condition was much better than would have been at all likely if an obstructed labour had caused tetanus of the uterus. Cæsarean section was chosen for delivery, because version seemed too dangerous (even if possible, which it probably was not) for both mother and baby.

Reviews.

PHYSIOLOGY FOR NURSES.

MUCH of the progress which has occurred during the present century in our understanding of bodily functions has been due to the growth of our knowledge of the chemical processes underlying them. Little indication of this growth is to be found, however, in certain elementary text-books of physiology, such as Smart's new edition of the well-known "Furneaux's Human Physiology".[1] This book, we are told, is used extensively for nurses in training. The nurses' edition differs from the school edition solely in the inclusion of a chapter on reproduction.

Books of this kind approach the subject of physiology from the point of view of the anatomy of the body with special reference to its osteology. Nurses in training might reasonably be expected to receive from other sources what instruction in human anatomy they may be supposed to need. Their training in physiology should approach the subject from the point of view of function. Instruction even in the most elementary form of gross anatomy should be incidental. Some discussion of histology is necessary in such a book; but it should be preceded by a brief explanation of what a histological section is and how it is examined. The student should be given some idea of the scale of the illustrations of sections, and descriptions of the simple tissues should precede, not follow, considerations of sections of organs.

Little discussions of the chemistry of the body and of metabolism can be expected in a book of this kind, but something more is demanded than what might be found, with not many differences, in a similar book of a generation ago. Much of a nurse's time is taken up with the management of the ingesta and ejecta of her patients. More space should be allotted to the consideration of nutrition in the broad sense. The treatment of this part of the subject should lay the foundation of a more detailed instruction in dietetics to follow later. Within the limitations of space imposed, great care is necessary to avoid the inclusion of statements likely to be misleading without further discussion. Few would agree with the unqualified statements, for example, that the mineral content of a diet can be allowed to look after itself, but that additions of artificial preparations of vitamins are necessary to ensure adequate rations of these constituents, or that the chief value of fruit and vegetables is to serve as sources of vitamin *C* and as mild laxatives.

Elementary text-books of physiology like this also leave much to be desired in their failure to present the quantitative aspect of the subject. It is obviously impossible for them to deal with this aspect in any detail. But even at an early stage of their training nurses could be introduced to the idea that the quantities of materials taking part in bodily reactions are sometimes of fundamental importance. An increasing part of the duties of a hospital nurse has to do with the collection of specimens of various kinds for quantitative examination. Such duties are still too often regarded as something apart from their real work, as a nuisance, or as the indulgence of some foible of the medical officer in charge of the case.

The principal reason for the survival of elementary text-books of the general plan of this one is probably to be found in the examinations, the "requirements" of which it is their object to "fulfil". This they do, no doubt, efficiently enough. Short paragraphs which are easily memorized are dear to the hearts of most examinees—and of some examiners.

CRICHTON ROYAL.

IN June, 1839, the Crichton Royal Institution was founded by private benefaction at Dumfries, Scotland, as an asylum for the insane. To mark the centenary Dr. Charles Easterbrook, in "The Chronicle of Crichton Royal",[2] has produced a voluminous history of the institution from its establishment and a record of the humane and rational system of treatment it has so successfully practised during that time. The author, who filled the position of surgeon superintendent for nearly thirty years, has succeeded in compiling an account of progress over the century; and while the book will naturally have a more intimate interest for those who have been associated with Crichton Royal, it contains much that could be studied with profit by all who have to do with the administration of mental hospitals.

As much of the subject matter is statistical, the book has been set out according to a plan in which the contents of each chapter are ranged under a uniform series of headings and subheadings. Thus for each year of the century are recorded the personnel of the board of management, list of officers, staff, patients' statistics, treatment *et cetera*, as well as records of official visits, board proceedings and legislation affecting the control of mental defectives. In addition, some notable events in history contemporary with the institution's progress are recorded in footnotes appended to each chapter. This is something more than a mere chronological record, however, for in these chapters may be followed the development from year to year of methods of care of the mentally ill which form the basis of much of the scientific treatment practised today.

As Crichton Royal was established to benefit its patients rather than to relieve the community of its troublesome insane members, the system of treatment adopted was a radical departure from the inhuman methods employed at that time. The substitution where possible of moral for physical restraint and the promotion of bodily and mental health by exercise, outdoor and indoor occupations and amusements were the aim of the founders. "The whole secret of the new system . . . may be summed up in the words kindness and occupation." Garden work, walking, driving and field sports fill the place of the cage, the cell and the chain. Patients are permitted the use of cutlery and glassware, educational facilities are provided, and religious services established. Provision is also made for the attendance of medical students who wish to make insanity a special study. The system thus laid down has been consistently followed and improved over the years, and the remarkable results achieved in treatment have placed Crichton Royal, in the words of Sir James Crichton-Browne, "in a leading place among institutions of its kind".

This work contains an immense amount of information relating to the institution and its activities. In addition to hospital accommodation Crichton Royal comprises farm lands, sports areas, and extensive gardens and parks; it also possesses a meteorological station and publishes a newspaper. The efficiency of its administration and the constant endeavour to promote the comfort and welfare of its patients make Crichton Royal a worthy memorial of its founders, Dr. James Crichton and Mrs. Crichton.

The book is well printed, the numerous portraits in half-tone calling for special mention. A full index is included, and various summaries and statistics are appended.

MACKENZIE'S "ACTION OF MUSCLES".

A REPRINT of the second edition of the late Sir Colin MacKenzie's book "The Action of Muscles" includes a brief biography of the author by his cousin Dr. C. V. Mackay, also an admirable frontispiece portrait.[1] The biographer tells us: "MacKenzie was not a slavish copyist of other men's work and ideas. He was an innovator and suffered a great deal of misunderstanding and adverse criticism of his work, the results of which were sometimes doubted, especially in Melbourne. In consequence, at one period before the Great War he became somewhat embittered and solitary in his professional life." This is unfortunately only too true. No doubt MacKenzie was himself in some slight measure to blame, for he sometimes allowed his enthusiasm to get the better of his judgement and, unlike Wordsworth's skylark, he occasionally roamed as well as soared. But by far the main share of the blame must fall on his medical colleagues, who had been brought up in an atmosphere hostile to research and who regarded any publication other than clinical and descriptive as a target for clever but unfair raillery. Time has brought an altered outlook. Formerly it was thought that in MacKenzie's work some good corn might be concealed in the chaff; the attitude today is that

[1] "Furneaux's Human Physiology"; new edition, completely revised (nurses' edition), by W. A. M. Smart, M.B., B.S., B.Sc., M.R.C.S., L.R.C.P., F.Z.S.; 1940. London: Longmans, Green and Company. Crown 8vo, pp. 384, with illustrations. Price: 5s. net.

[2] "The Chronicle of Crichton Royal (1833-1936): Being the Story of a Famous Mental Hospital during its First Century and Illustrating the Evolution of the Hospital Care and Treatment of Mental Invalids in Scotland", by C. C. Easterbrook, M.A., M.D., F.R.C.P.E., with a foreword by J. Crichton-Browne, M.D., LL.D., F.R.S.; 1940. Dumfries: Courier Press. Royal 8vo, pp. 663, with 103 illustrations. Price: 25s. net.

[1] "The Action of Muscles, including Muscle Rest and Muscle Reeducation", by Sir Colin MacKenzie, M.D., F.R.C.S., F.R.S.; reprinted from the second edition, with a biographical note by C. V. Mackay, M.D., F.R.A.C.P.; 1940. London: H. K. Lewis and Company Limited. Demy 8vo, pp. 302, with 100 illustrations. Price: 12s. 6d. net.

if a small percentage of glumes has been retained around the good grain it can be winnowed away by a breath.

It was a pity that MacKenzie, who was a first-class anatomist, did not think it necessary to study the physiology of muscle and muscle innervation as set out in the writings of Sherrington and others. Many of the problems he investigated, such as the action of gravity and the relation of synergists and antagonists, had already been dealt with in a masterly manner. Some slips would have been avoided whilst certain principles, such as the lengthening and shortening reaction, he would have welcomed and put to good use. Langley, the Cambridge physiologist, had shown that massage accentuated the degeneration of a muscle isolated from the central nervous system. MacKenzie, as the result of his own observations and thinking, pleaded with his colleagues not to apply electricity or massage until the muscle had recovered or harm would be done. His warning, sound as we know it to be now, was not taken seriously. The main principles of MacKenzie's treatment of paralysed muscle may be briefly summarized as follows. The muscle must be placed in a position of rest and be shielded from the unopposed pull of antagonists. When the degeneration stage, really inflammatory, is over and recovery has begun, as evidenced by voluntary movement, however small this may be, then reeducation of the muscle must be begun by graded exercises starting from zero. MacKenzie gives in considerable detail the positions of rest for each of the important muscles and the precise exercises which the reeducation process should include.

One unique feature of MacKenzie's work was his research on the comparative anatomy of Australian vertebrates, putting to shame those zoologists who had devoted their research energies to crustaceans and worms. Some of the applications of this knowledge to human medicine and surgery may not commend themselves to the reader, as for example, his suggestion that thymus extract might be used in the treatment of poliomyelitis paralysis because the strong wombat has no thymus whereas the weakly platypus, Tasmanian devil and Tasmanian wolf have large and persistent thymus glands throughout life! Still the amount of genuine discovery in this fascinating field of comparative anatomy is assuredly great and will keep MacKenzie's name alive when his critics are forgotten.

In the first chapter there is an exposition of the main principles of muscle action, and then in the subsequent fourteen chapters each important joint and muscle is described in detail, also the effects of paralysis of such nerves as the median, ulnar and musculo-spiral. As stated, methods of splinting and reeducation are given in detail, and here much of what was revolutionary and strongly suspect in 1918 is accepted today as correct doctrine. Joint fixation is naturally treated from the surgical aspect. No doubt here and there a dogmatic statement is made which will arouse protest in the reader, such as the vigorous denial that the biceps is a flexor of the elbow; but such should not blind the reader to the stimulating and highly practical qualities of the book. The publishers in a special note express the belief that the book "will continue to be of use to orthopædic surgeons and masseurs". With this opinion we can cordially agree and congratulate H. K. Lewis and Company on their good judgement in reissuing the volume when there is every likelihood that its principles and methods will be put to use with, alas, an ever-increasing number of wounded soldiers and civilians.

THE NEUROGENIC BLADDER.

IN the preface to "The Neurogenic Bladder"[1] the author, F. C. McLellan, admits that he has not the courage of his etymological convictions by succumbing to the temptation of employing the commoner term "neurogenic" instead of the correct term "neurogenous". The instrument with which estimations of intravesical pressure are made, the readings being the basis of the whole subject, is called a cystometer; but, as an Italian urologist has recently pointed out, the correct term is cystomanometer. Cystometry, as the American writer will have it, is defined by this author as the study of the physiology of the bladder muscle and its abnormal behaviour in relation to diseases of the central nervous system. This study is graphically portrayed by charts, built up from registration of the intravesical tension resulting from the presence of gradually increasing amounts of fluid. Throughout these studies the pressure readings are recorded in centimetres of water by the Munro cystometer. Some other writers consider that water instruments are too cumbersome for clinical use and prefer a mercury manometer. Cystometric study is to be considered as a neurological investigation, but urologists are increasingly adopting the method in their clinical practice. The type of curve shown in the chart determines the tonus of the detrusor muscle of the bladder. In post-infantile life cerebral control is exerted over purely reflex detrusor activity. The bladder reflex arc travels by the second, third and fourth sacral segments and the pelvic nerves, and in the infant this is the only path concerned in bladder activity. It is also the only path available in all lesions destroying conductivity in the spinal cord above the second, third and fourth sacral segments, so that, with such injuries and diseases, the patient develops bladder activity of the infantile reflex type. Should, however, the destruction involve the lowest part of the spinal cord or the *cauda equina*, reflex activity of the bladder is interrupted and emptying is possible only by overflow or abdominal straining. In a typical normal cystometric chart, the plotted line rises evenly from zero at an angle of about 15° from the horizontal, along which latter direction the volumes of introduced fluid in cubic centimetres of water are charted, while vertically the pressures are noted by the same measurement. The graph is made by charting the pressure at every 50 cubic centimetre level during the filling. Rapid rises, which subside soon, may occur through reflex uninhibited detrusor activity during the filling; but in the normal bladder, with uniform and careful filling, such uninhibited rises should not occur. The pressure at the first desire to void is carefully noted. This first desire usually occurs with between 100 and 150 cubic centimetres of fluid, and the pressure is about two to five centimetres of water. The pressure curve rises gently from zero to between eight and fourteen centimetres of water, which latter pressure is present when full capacity is reached. Full capacity is usually between 300 and 500 cubic centimetres. It is interesting to note that the normal infantile reflex bladder can be studied by cystometry, and in these cases the pressure chart, in contradistinction to the almost horizontal one of the adult, rises very steeply at an angle of about 60° or 70° to the horizontal. The first desire cannot be estimated, but capacity is at about 75 cubic centimetres. Uninhibited contractions occur at several points during the filling, pushing the pressure suddenly up to 40 or even 60 centimetres of water. In the various types of uninhibited neurogenic bladder the tendency is for the pressure curve to be steeper than normal, and occasional uninhibited contractions occur, pushing the pressure momentarily up to 40, 50 or even 80 centimetres of water. In the atonic neurogenic bladder, as occurs in *tabes dorsalis*, there is no first desire felt by the patient, the capacity is 800 cubic centimetres or more, the pressure curve rises very slowly and lies flat down near the horizontal and no uninhibited contractions occur. Similar results are obtained from the atonic neurogenic bladder of multiple sclerosis, pernicious anæmia and *diabetes mellitus*. The author's conclusions are that the bladder is a reflex organ, the stimulus for contractions being the "stretch reflex" of the bladder wall. The cerebral function in bladder control is a supranuclear inhibition of the bladder reflex in order to obtain adult type of micturition. The hind-brain probably governs the prolonged contraction necessary for complete evacuation. Cystometric study is more than a urological examination; it is a neurological examination of a spinal cord reflex.

[1] "The Neurogenic Bladder", by F. C. McLellan, M.S., M.D.; 1940. London: Baillière, Tindall and Cox; Baltimore: C. C. Thomas. Medium 8vo, pp. 222, with illustrations. Price: 22s. net.

A YEAR BOOK OF PATHOLOGY AND IMMUNOLOGY.

THE "Year Book of Pathology and Immunology" is an American publication and is one of fourteen comprising the "Practical Medicine Series" of Year Books.[1] In the present volume the section dealing with pathology is edited by Howard T. Karsner, professor of pathology, Western Reserve University, Cleveland, and that relating more specifically to immunology by Sanford B. Hooker, professor of immunology, Boston University School of Medicine.

As the title implies, the objective of the book is similar to that of the familiar "Medical Annual" and it presents concisely the essential facts of 678 articles, carefully chosen and annotated from 58 medical periodicals published in the United States and 61 published in 13 other countries.

[1] "The 1940 Year Book of Pathology and Immunology", edited by H. T. Karsner, M.D., and S. B. Hooker, A.M., M.D.; 1940. Chicago: The Year Book Publishers. Crown 8vo, pp. 688, with illustrations. Price: $3.00 net.

The "Year Book", however, is something more than a discriminating collection of abstracts, illuminated as it is by editorial comments and many excellent illustrations. It should be of particular value in the present period of international upheaval when the circulation and interchange of scientific journals is subject to so much hazard and interruption. The "Year Book of Pathology and Immunology" also embraces much that is of interest in medicine and surgery; it could hardly do otherwise and be true to its name, surgery and pathology, medicine and immunology, being essentially indivisible.

There are few who do not need some guide through the apparently limitless labyrinth of medical literature, much of which, it is to be feared, is more medical than literary. Publications such as the "Year Book" series effectively assist the busy practitioner to find his way through the maze and to emerge in possession of facts and references the acquisition of which would otherwise be very laborious.

This attractively produced and compact volume may be confidently recommended to students, practitioners and research workers who wish to explore, with the aid of a pathological "Baedeker", recently opened chapters in pathology and immunology. It also serves to emphasize the value of well-chosen and carefully prepared annotations, and should suggest to many that the "Abstracts" column in their weekly journal is one deserving of more attention.

ANÆSTHESIA FOR THE STUDENT AND GENERAL PRACTITIONER.

A FIFTH edition of "Handbook of Anæsthetics", formerly edited by Ross and Fairlie, has been revised by R. J. Minnitt.[1]

The work retains its original character and has been brought up to date by the inclusion of chapters on the closed circuit technique, vinesthene and gas therapy. Written "to be a useful guide to those students who wish to learn the art and science of anæsthesia", this book remains one of the classics of anæsthetic literature. In simple terms it sets forth the basic principles of the physiology of respiration, deals with the signs of shock and gives excellent detail of the management of patients for anæsthesia.

All the recognized methods are described in detail adequate for the sound education of students, and to those learning anæsthesia and to the general practitioner this book is warmly recommended. The more advanced anæsthetist will find the description of the modern adaptations inadequate; but he need not complain, since the book is not intended for him. This book admirably fulfils its purpose.

A YEAR BOOK ON PUBLIC HEALTH.

THE books of the "Practical Medicine Series" are well known to Australian practitioners; for forty years they have been published in the United States of America. The latest addition to the series, and one that is certain to receive a warm welcome from all who have any interest at all in the subject, is "The 1940 Year Book of Public Health".[2] The editor of this volume is Dr. J. C. Geiger, Clinical Professor of Epidemiology in the University of California and Director of Public Health of the City and County of San Francisco. The general plan conforms to that of the Practical Medicine Series. Professor Geiger has given a précis of 421 articles dealing with different aspects of the subject and in many instances he has appended to the précis a short and appropriate editorial comment. Apparently the year covered is from July, 1939, to July, 1940, though one or two references to articles published before July, 1939, appear.

The book is arranged in several sections. The first has to do with communicable diseases and epidemiology, and this is divided into subsections devoted respectively to general considerations, tuberculosis, poliomyelitis, malaria and venereal diseases. In the first of these subsections there is reference to articles on endemic typhus fever, rickettsial infection, cholera, Weil's disease, meningococcal infections, and so on. Surprisingly there is no reference to "Q" fever and the work published by Australian investigators in July, 1939. There are important contributions on leprosy. The subsection on tuberculosis covers eighty pages and every aspect of the subject appears to be considered. The subsection on malaria is important and that on venereal diseases should be in the hands of every medical practitioner who is called upon to treat patients so affected. The sections on food and milk and on nutrition are what one would expect to find; but the inclusion of a separate section on housing shows that medical men everywhere are beginning to realize that this is at least partly their responsibility and that they can make a contribution to the solution of the problems that it presents. The section marked "Statistical" may not, on account of its title, appeal much to the average medical reader, but it is full of interesting material. The section on the laboratory will be of most use to the special worker, but the section on industrial hygiene is replete with information that will be of value to all practitioners who attend those engaged in industrial pursuits. The section on administration again is rather specialized, but those on medical care and child hygiene will hold the interest of any medical man or woman.

This volume in our opinion will achieve success; in many respects it will satisfy a long-felt want. Apart from this, however, it is a book that may be picked up at any time to provide half an hour's interesting reading.

[1] "Handbook of Anæsthetics" (formerly Ross and Fairlie), revised by R. J. Minnitt, M.D., D.A.; Fifth Edition; 1940. Edinburgh: E. and S. Livingstone. Crown 8vo, pp. 378, with illustrations. Price: 12s. 6d. net.

[2] "The 1940 Year Book of Public Health", edited by J. C. Geiger, M.D., Dr.P.H.; 1940. Chicago: The Year Book Publishers Incorporated. Crown 8vo, pp. 560, with diagrams. Price: $3.00 net.

Notes on Books, Current Journals and New Appliances.

A VOLUME OF POST-GRADUATE LECTURES.

A MOST interesting volume comes from Edinburgh; it is the first volume of "Edinburgh Post-Graduate Lectures in Medicine".[1] The executive committee of the Edinburgh Post-Graduate Courses received a grant from the trustees of the late Mrs. Honyman Gillespie and decided to use the grant to institute a series of lectures which would be open *gratis* to all practitioners and students of medicine. Lecturers were selected, the lectures were given and were well attended; they were then published in the *Edinburgh Medical Journal*, were then revised and now appear in book form. The present volume contains thirty-three chapters, dealing with a variety of subjects of great interest, and the following list will give some idea of the scope of their range: "Some Modern Problems of Neurology", "The Therapeutic Use of the Barbiturates", "Disorders of the Interstitial Circulation", "The Rational use of Digitalis", "Protein in the Treatment of Nephritis", "Diet and Dyspepsia", "Hepatitis", "Recent Developments in the Surgery of Obstructive Jaundice", "Pernicious Anæmia and Its Treatment", "Primary Toxic Goitre", "Dysmenorrhœa", "The Dynamics of Crowd Infections". This is a useful book; it is extremely well printed and is not expensive.

A BOOK ON TREATMENT IN GENERAL PRACTICE.

THE articles on treatment in general practice that have appeared in the pages of *The British Medical Journal* have been republished in book form. Already three of these volumes have been noted in this journal. A fourth volume has now appeared.[2] It is larger than any of the others and comprises articles published between July, 1938, and May, 1940. The contributions deal entirely with surgery. The third volume contained many articles on surgery and the Editor of *The British Medical Journal* in the preface to the present volume expresses the hope that these two will provide "a complete conspectus of surgery for the general practitioner who pursues the craft in his every day work". The present (fourth) volume contains 55 articles, so that it is not possible to reproduce their titles. We welcome this volume as we welcomed its predecessors; it will find a useful place in the general practitioner's library.

[1] "Edinburgh Post-Graduate Lectures in Medicine. Volume I"; 1940. Edinburgh: Oliver and Boyd (for the Honyman Gillespie Trust). Medium 8vo, pp. 529, with illustrations. Price: 10s. 6d. net.

[2] "Treatment in General Practice: Surgery (continued"; articles republished from *The British Medical Journal*; Volume IV; 1940. London: H. K. Lewis and Company Limited. Demy 8vo, pp. 576, with 143 illustrations. Price: 16s. net.

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

MEDICAL SOCIOLOGY.

WHEN a medical practitioner considers the cause of disease he generally thinks about the "seed" and the "soil". Therefore, when he investigates the illness of an individual patient he looks for an infective agent and for signs that will indicate its virulence; he also tries to estimate the ability of the patient to stand up against the onslaught of the invader. To try to foretell the outcome of an illness by recognition of a microorganism and its virulence, without consideration of a patient's powers of resistance, is as foolish and just as likely to be misleading as it would be in wartime to attempt to forecast the outcome of an invasion by a count of the invaders and an inspection of their personnel and equipment, without any assessment of the numbers, resource, courage and equipment of the defenders. Yet this is sometimes done by the inexperienced. The plaint is commonly heard that far too much attention is paid to the active agent in a disease and that not enough is given to the state of the patient's resistance. This may be partly the result of text-book reading by students in their undergraduate days. Diseases are usually defined as infections due to such and such an organism. For example, we read that lobar pneumonia is "an infective disease of the lung, running a short and characteristic course, directly resulting from a general infection of the blood, and the subsequent localisation and multiplication within the pulmonary tissue of a specific microorganism, the pneumococcus". A definition of pneumonia for teaching purposes could not very well go further than this, and the student as a consequence has the words pneumonia and pneumococcus so fixed in his mind that he needs to be constantly reminded, at least for some considerable time, that the susceptibility of the pulmonary tissues to invasion by the pneumococcus is essential to the occurrence of the disease. When once the student has grasped the fact that the resistance of the patient is an all-important factor in the causation of disease, it should not be very difficult for him to take an interest in the conditions that may increase or lower that resistance. If a patient is found to be living or working in surroundings that are likely to make him an easy prey to disease, it immediately becomes part of treatment to see that he is removed to a healthier *milieu*. Generally, however, we may say that such conditions bring us into the province of preventive medicine.

Preventive medicine is recognized by all members of the medical profession and by the more enlightened members of the laity to be inseparable from the activities of every practitioner, and the officers of public health departments are looked on as specialists in particular branches of the subject. It is, however, doubtful whether the majority of medical men and women and many of the laity realize how extensive are its ramifications. If we define preventive medicine as covering the efforts that should be made by medically trained persons to prevent the active agents of disease from gaining access to human beings and to keep the individual members of the community so exuberant in health that they will repel the attack of any agents that may pass the preventive barrier, we see how enormous the field really is. It covers anything that has to do with the physical and mental welfare of man. On many occasions in the past we have insisted in these pages that preventive medicine must concern itself with the whole social question—with housing and overcrowding, with the effects of grinding poverty, with nutrition and the dole, with physical training suited to persons of different ages, with the proper use of leisure, and so on. Fortunately there are in the ranks of Australian medicine some who accept this point of view and are prepared even at some personal inconvenience to put their beliefs into practice. There are others who perhaps agree in theory, but either think that the whole business is no affair of theirs or are interested in too many other activities to take part in what appears to be a thankless task. There is probably a third group of those who do not agree or refuse to give the matter any thought. It should be the constant care of those in the first group by their missionary zeal to eliminate the third group and to reduce as far as possible the number of those in the second. Now is the time when public interest and interest within the ranks of the profession can most easily be aroused. The rigours and austerities of war have forced many changes on the British nation, and changes in ways of life are expected where they have not yet taken place. It will be freely admitted that the wider problems of preventive medicine are shared by other groups in the community, but the contribution that can be made by medically trained persons is of the greatest importance and medicine must therefore take the lead. That these considerations are engaging the attention of leaders in medical thought in Great Britain is shown by a discussion recently held by the Section of Epidemiology and State Medicine of the Royal Society of Medicine and reported in the October, 1940, issue of the *Proceedings* of that body. The discussion really centred around the clinical teaching of social medicine, but both the main speakers, N. M. Goodman and Cherry Morris, referred to what we have called the wider problems of preventive medicine. Goodman pleaded for the introduction into the clinical teaching given to students

at the bedside of discussions on the social aspects of a patient's illness, and Morris in the following words supported views often expressed in this journal: "No teaching of social legislation or of the names and functions of voluntary and statutory bodies for the relief of distress can avail much if the student has not first learned to see health in its relation to life and has not realized that poverty and unhappiness can be the cause as well as the result of illness. He has to recognize the fact that medicine is no substitute for adequate food, that the anæmic girl will be slow to recover while working in an unhealthy basement, and that the result of even the most brilliant operation can be nullified if the patient struggles back to work before he is fit."

Interest in this subject among the members of the medical profession of Australia will be stimulated best by discussion. The time has therefore come when enthusiasts should consider the formation of a "special group" within the British Medical Association in Australia for the study of medical sociology. As a preliminary to such a move we would suggest that in each of the Australian Branches during the coming year at least one meeting be devoted to one of the subjects included in the wider comprehension of preventive medicine.

WIRELESS TRANSMITTING APPARATUS (POSSESSION) ORDER.

THE attention of all medical practitioners is directed to a statement that was published in last week's issue of this journal regarding an order, to come into force on April 1, 1941, and dealing with the control of diathermy and other high-frequency apparatus. That the Commonwealth Government would take some action of this sort under the National Security Regulations was to be expected. The action taken is by no means excessive, but if the provisions are properly policed, it should be effective. If any practitioner who uses apparatus of this kind in his practice should not at once appreciate the need for control at the present time, we would refer him to *The British Medical Journal* of September 7, 1940, at page 333, and to the Supplement of the same journal dated September 21, 1940, at page 25. The Parent Association in England recognized the necessity for the drastic order that was issued and no steps were taken to have it modified. Unfortunately in Australia many persons other than medical practitioners use apparatus of a type covered by the new order and control will therefore be more difficult. However, the security of Australians as a free people must come first and this will be recognized in spite of personal inconvenience and even of hardship to the individual. Non-compliance with an order such as this should carry a heavy penalty.

Current Comment.

GLOSSITIS AND THE VITAMIN B_2 COMPLEX.

No reader of present-day medical literature can fail to be impressed with the importance of the vitamin B_2 complex. Deficiencies seem to be more pronounced in tropical or subtropical climates, so that the subject is of great interest to Australian practitioners. The simplest definition of the vitamin B_2 complex is that it is an assemblage of some of the water-soluble vitamins present in yeast. P. H. Manson-Bahr[1] has recorded some clinical observations made with the object of investigating the ætiology of tropical sprue and allied diseases, and has shown that glossitis, probably of a similar nature and non-specific to the disease, is found in pellagra, sprue, pernicious anæmia, the nutritional anæmias and idiopathic steatorrhœa, and that through this and other features, such as changes in the spinal cord, these diseases are closely related to one another. He suggests, therefore, that a deficiency of the vitamin B_2 complex, which appears to be common to all, may partially explain these phenomena. Nicotinic acid and riboflavin certainly play an important part in the treatment of sprue as well as of pellagra, pernicious anæmia, subacute combined degeneration of the cord and, to some extent, of idiopathic steatorrhœa.

Manson-Bahr believes that these diseases are so closely related to one another that borderline cases are often encountered, embodying the salient features of two or even more of the group. He describes some typical borderline cases. The whole subject is of great interest when considered in conjunction with the work of Harriette Chick on whole-meal, which was recently mentioned in these columns. Chick showed that in the manufacture of white bread valuable material rich in the whole vitamin *B* complex is discarded (and fed, by the way, to animals, which we often treat more sensibly than ourselves). Although the diseases considered in Manson-Bahr's article are commoner in the tropics than elsewhere, they are by no means unknown in subtropical and temperate climates. R. E. Hope Simpson[2] has described a case of fatal pellagra in an English schoolgirl who had subsisted largely on white bread and butter. As for sprue, it is difficult to believe that tropical sprue originates in the tropics alone, unless the local conditions comprise some initial and decisive factor, such as a virus. It is well known that sprue may arise *de novo* in persons who have resided in England ten to twenty-five years after having quitted the endemic area. Certainly minor degrees of the deficiencies underlying these diseases are probably quite common amongst ourselves, and a common cause may link mild dyspepsias with sprue or "the irritability of fatigue with the insanity of pellagra".

CARCINOGENIC AGENTS IN THE LIVER.

FOR many years physicians have watched the work of cancer research specialists with mixed feelings. On the one hand they admired the immense amount of work done and the highly important results obtained by them. On the other hand they could not refrain from repeating the question: "How does all that help us?" "Our patients do not swallow o-amido-azotoluol, nor do they paint their skin with tar or one of its derivatives. The tumours we have to deal with in our daily practice have certainly very little to do with these experimental neoplasms."

The first connecting link between experimental and clinical medicine was established a few years ago when it was found that one of the new carcinogenic hydrocarbons, methylcholanthrene, was closely related to the cholic acids and cholesterol. It could be shown that in the test tube one could be transformed into the other by a rather simple process. The immediate results of this very important discovery have been rather negative. As it became evident that not only bile acids and cholesterol but also sex hormones were rather closely related to these carcinogenic compounds and that sex hormones at least in very high doses could actually produce tumours in animals, practitioners became rather reluctant to use sex hormone

[1] *The Lancet*, September 14 and 21, 1940.
[2] *The Lancet*, November 9, 1940.

preparations for therapeutic purposes for fear that they might do more harm than good in the long run.

Latest discoveries, reports of which appear in *The American Journal of Cancer* of August, 1940, seem to make the situation even more complicated for the physician, although they open new and very interesting prospects from the scientific point of view. L. M. Shabad, of Leningrad, has been working for four years with benzol extracts of liver from patients who had died from some type of malignant tumour. In conjunction with H. H. Klienenberg and S. A. Neugach he reports on the results so far obtained. Injection of such extracts into mice of a strain of well-known tumour incidence produced malignant tumours at the site of injection as well as in distant organs in a number of animals which exceeded by far the rate of spontaneous tumour formation in this strain. The use of livers from patients with malignant tumours but without metastases in the liver gave the highest results. Extracts from liver with metastases seemed to contain carcinogenic substances in a smaller number of cases, but it is noteworthy that even liver extracts from patients free from malignant tumours produced animal neoplasms in a larger number of cases than was to be expected from this strain.

Confirmation of these results has come from quite another part of the world. In South Africa, M. J. A. Des Ligneris commenced independently similar experiments on account of the fact that liver carcinoma is so much more common amongst certain native races living in tropical and semi-tropical regions of Asia and South Africa than in Europeans. All attempts to explain these differences have been so far futile. He thought that the examination of liver extracts both from Bantus (with and without liver cancer) and from Europeans might throw some light on the metabolic peculiarities of these native races. He secured the cooperation of the Research Institute of the Royal Cancer Hospital, London, where most of the important work on the carcinogenic hydrocarbons has been done, and Izrael Hieger reports in the same journal independently on the results he obtained with those extracts. In both series of experiments tumours in animals were produced by extracts of liver from Bantus and Europeans with cancer, from Bantus without cancer, but not from Europeans without cancer. The majority of the animal tumours resembled those produced by the carcinogenic hydrocarbons.

It is beyond any doubt that these results are of extraordinary importance. Though far from being of practical value at the present moment, they may lead us a step further towards an understanding of the processes leading to the formation of the intrinsic factors in tumour genesis. Nothing so far is known about the chemical nature of the compounds concerned as only crude extracts have been used in the experiments. Shabad himself sums up: "These first results should be accepted with great caution and, what is most important, we must constantly bear in mind the enormous obstacles which we have to overcome in the new and arduous, though necessary, way of further research now opening before us."

ADMINISTRATION OF BILE IN OBSTRUCTIVE JAUNDICE.

WHEN through any cause bile fails to reach the duodenum, grave disturbances of digestion take place over and above the effects on the body generally of the bile salts and pigments which have been absorbed into the blood stream. If the pancreatic juice is gaining normal admittance to the small intestine, then the usual splitting of the fats takes place, though at a lower speed. It is in the faulty absorption of the fatty acids thus liberated that biliary obstruction makes itself most manifest in digestion. According to classical physiology all the fatty acids above lauric, and these include palmitic, stearic and oleic, being insoluble in water, remain totally unabsorbed; whereas of those below lauric, for instance, butyric, capric, caproic and caprylic, a certain small percentage is able to traverse the intestinal lining and, reuniting with glycerol, reconstitute true fat. The unabsorbed fatty acids, and these constitute by far the greater proportion, give the fæces their characteristic texture and volume. It is obvious that grave disturbance to fat metabolism is produced and much of the patient's weakness has been ascribed to this factor. In 1933 R. Douglas Wright, now Professor of Physiology in the University of Melbourne, announced that the administration of 4·8 grammes of bile coated with salol at each meal in which the usual fats were included produced a fall in fæces fat, a rise in blood fat and a marked improvement in the condition of the patient suffering from obstructive jaundice. As a result of his investigations he advocated this as a pre-operative procedure.[1]

The problem of the faulty absorption of fats presented a totally new and unexpectedly important phase when it was realized that the fat-soluble vitamins needed bile for their admission to the blood stream. Avitaminosis rather than deficient blood fat or icteric poisoning loomed as the main causative agent in making jaundiced patients such bad subjects for surgical operation. The possibility that the absorption of the fat-soluble vitamins was furthered by the administration of bile immediately suggested itself. M. F. A. Woodruff and R. Douglas Wright in October, 1940, using an improved biophotometer for measuring dark-adaptation time as a criterion of vitamin *A* deficiency, showed that in biliary obstruction, provided the pancreatic secretion was normal, administration of bile by the mouth reduced the *A*-avitaminosis and was followed by a decided improvement in the patient's general bodily state. They inferred that vitamin *D* would be similarly affected.[2] In America J. D. Stewart found a considerable increase of vitamin *K* assimilation when this vitamin or a vitamin *K* extract was administered with bile admixed.[3] There was a corresponding rise of prothrombin in the blood and an equally pronounced fall in the surgical risk. The natural inference from such experimental and clinical findings would seem to be that bile denied to the digesting food by a delinquent hepatic mechanism should be artificially added to each meal, but J. D. Stewart has recently sounded a warning.[4] The ox bile given orally is absorbed and increases the concentration of bile salts in the blood, thus augmenting the general toxic condition. Bile has been described as Nature's successful attempt to produce a non-poisonous soap; non-poisonous it certainly is in the bowel and in the portal circulation, but spilled on the peritoneum or liberated into the general blood stream, its soapiness becomes dangerous. Again, bile is a strong stimulant to the bile-secreting mechanism of the liver; indeed, many pharmacologists have described it as the one and only cholagogue. There is therefore a possibility that the diseased liver may be unduly stimulated when rest is essential. The intravenous injection of bile salts has also been followed by albuminuria and cylindruria and other manifestations of renal impairment.[5] It is interesting to note that J. D. Stewart, who, as stated above, advocated the oral administration of bile to aid in the absorption of vitamin *K*, now recants and will add bile to food only when the obstruction has been removed by surgery; he prefers to give vitamin *K* parenterally. An extension of this procedure to persons suffering from deficiency in vitamins *A* and *D* is to be expected.

[1] *The Australian and New Zealand Journal of Surgery*, April, 1933.
[2] *The Australian and New Zealand Journal of Surgery*, October, 1940.
[3] *Annals of Surgery*, Volume CIX, 1939, page 588. *The Journal of the American Medical Association*, Volume CXIII, 1939, page 2223.
[4] *The New England Journal of Medicine*, December 26, 1940.
[5] *Archives of Pathology*, Volume XX, 1935, page 866.

Abstracts from Medical Literature.

MEDICINE.

Lymphosarcoma.

EVERETT SUGARBAKER and LLOYD F. CRAVER (*The Journal of the American Medical Association*, July 13, 1940) report a study of the ætiological and clinical features and the results of treatment in 196 histologically proved cases of lymphosarcoma. They observed that in 32% of the cases in which the first symptom was cervical adenopathy, there had been or was present definite chronic infection of the upper respiratory tract. The average age of their patients was forty-five years and the ratio of males to females was seven to three. Of the conditions that were present, 184 were classified as reticulum cell lymphosarcoma, nine as giant follicular lymphoma and three as malignant lymphocytoma. The early stages in their cases were characteristically free of constitutional symptoms, being signalized by the presence of external lymph gland enlargement in 65% of instances. Abdominal symptoms were first noted in 17·5%, upper respiratory tract symptoms in 11·6%, thoracic symptoms in 3·6% and bone pain in 1·8%. The authors state that lymphosarcoma commonly begins and runs its early course only in lymph nodes, and that two-thirds of their patients did not show evidence of an extranodal primary lesion. The extranodal primary lesion in the other third of the cases was located in the structures of the head and neck, chiefly the tonsil and naso-pharynx, in 65%, in the intestinal tract in 16% and in widely scattered areas in the remaining 19%. The site of the primarily involved lymph glands was found to be in the neck in 59%, in the axilla in 11·4%, in the groin in 11·9%, in the abdomen in 13·1%, in the mediastinum in 1·1% and in the epitrochlear region in 0·5%, whereas practically the entire lymph gland system appeared to be affected simultaneously in 2·8%. It was noted that the spleen was palpable in 21% of cases, the liver was palpable in 8%, radiographic evidence of pleuropulmonary disease was present in 12%, osseous lesions were present in 9% and metastatic skin lesions occurred in 5·5% of the series. The authors state that anæmia is slower in developing in lymphosarcoma than in Hodgkin's disease, and although there is no characteristic blood picture for lymphosarcoma, the differential count in general showed a predominance of cells of the granulocytic series. Various methods of treatment were employed including X rays, radium, X rays and radium combined, Henbiein total irradiation and surgical extirpation. Prophylactic irradiation was carried out only as a supplement to initial surgical therapy. In a group of 132 patients of this series, there was a five-year survival rate of 15·9% and 10·6% are living after five years or more and are apparently cured; of the 21 patients with a five-year survival only four had more than one area affected initially. The authors form the opinion that the factors influencing the course of the disease are its individual inherent qualities for growth and dissemination, the extent of disease on admission of the patient to hospital, the location of the primary lesion, complicating pseudo-leuchæmia or leuchæmia and the age of the patient. From an analysis of the results of treatment, they suggest (*a*) that radical surgical removal followed by prophylactic external irradiation for clinically early and easily accessible disease is worthy of consideration and further trial, (*b*) that for the more advanced stages of the disease either local X-ray irradiation *plus* total X-ray irradiation or local X-ray irradiation alone is superior to local X-ray *plus* radium pack irradiation or radium pack irradiation alone. They also suggest that divided dose therapy with simple doses of from 400 to 600 *r* and total doses per field of from 2,000 to 3,000 *r* yield the best results.

Prophylactic Vaccination Against Pertussis.

FU-T'ANG CHU AND JUI-P'ING WU (*The Chinese Medical Journal*, July, 1940) present a report of a controlled study of prophylactic vaccination against whooping cough in an orphanage, where facilities for isolation were entirely lacking. They state that none of thirteen children who had been vaccinated prior to the outbreak of an epidemic of pertussis developed the disease in spite of continuous and prolonged exposure, whereas twenty-three or 67·6% of thirty-four non-vaccinated children, whose age, mode of living, and degree of exposure were the same as those of the vaccinated group, developed typical pertussis. The vaccine used was prepared from freshly isolated Phase I organisms and administered according to Sauer's method. The authors conclude from the results of their study that the value of *Bacillus pertussis* vaccine as an efficient agent of active immunization to be proven.

Staphylococcus Aureus Bacteriæmia.

C. H. RAMMELKAMP AND C. S. KEEFER (*The New England Journal of Medicine*, November 28, 1940) describe the treatment of *Staphylococcus aureus* bacteriæmia with sulphathiazole. Sulphathiazole inhibits growth of this organism in broth and urine. A blood concentration of 2·5 to 5 milligrammes per 100 cubic centimetres is necessary to obtain maximum clinical results. Seven cases are reported. *Staphylococcus aureus* was recovered from the blood in all cases. Sulphathiazole was given in doses of two to six grammes daily by mouth for one to three weeks; concentrations of 2·0 to 6·7 milligrammes per 100 cubic centimetres were obtained. Three out of the seven patients recovered. The number of organisms in the blood is diminished after treatment. Blood transfusions and surgical drainage of localized abscesses are found to be important factors to aid recovery.

Treatment of Sydenham's Chorea.

SIMON STONE (*The New England Journal of Medicine*, September 26, 1940) discusses the treatment of Sydenham's chorea by fever and vitamin *B* therapy, and reports the results of such treatment administered to twenty patients. The author reviews the medical history of this disease and quotes the clinical notes of nine of his patients. The children treated were suffering from chorea in various degrees of severity, and the therapy given in severe cases, irrespective of the presence of an advanced cardiac lesion, consisted of six or seven "Inductotherm" fever treatments once every three or four days, the temperature being maintained at 104° F. or over for two hours, followed shortly afterwards by the intravenous injection of 10 to 15 milligrammes of thiamin chloride. These patients also received four to eight cubic centimetres of vitamin *B* complex orally three times a day. In the moderately severe and mild cases the children were not admitted to hospital; they received four to eight cubic centimetres of vitamin *B* complex orally, supplemented by other vitamins. Improvement was evident in a few days, although it was less spectacular than in the fever-treated groups. In the cases in which electropyrexia was used, recovery was produced with fourteen hours of fever at 104° F. or over, and when this was combined with vitamin *B* therapy, improvement in the advanced cardiac lesion, if present, was noted. In the moderately severe and mild types of cases in which oral treatment was given, symptoms disappeared mostly within one month. The author is of the opinion that the action of fever on chorea is probably non-specific, similar to its action on arthritis and asthma, producing general capillary dilatation, reducing vasospasm in the joints and small cerebral blood vessels, improving the flow of blood, increasing the number of circulating red cells in the blood stream, improving oxygenation and accelerating the supply of oxygen to all parts of the brain, besides probably also assisting in mobilization of all the defence mechanisms of the body. He states that if it is too long continued, however, artificial fever produces vasomotor paralysis and cyanosis rather than increased oxygenation, and consequently he limits the number of hours of fever given to his patients to about two. The author observed no untoward reactions during the fever treatment and following the intravenous vitamin *B* therapy; his method of administration of thiamin chloride during the stage of capillary dilatation and improved circulation shortly after the cessation of fever therapy is thought by him to produce better diffusion of the medication throughout the central nervous system. The rationale of the administration of vitamin *B* complex to sufferers from chorea is based on the belief of the author that infection alone is not responsible for the symptoms of the disease, but that there is an added ætiological factor of metabolic disturbances due either to food deficiency or to inability to metabolize certain protective substances in the diet.

Hæmorrhagic Diathesis.

W. W. WADDELL AND G. M. L. LAWSON (*The Journal of the American Medical Association*, October 26, 1940) discuss prevention and treatment of the hæmorrhagic diathesis of the new-born. Prothrombin deficiency has been demonstrated in this disorder and has been shown to be associated with deficiency of vitamin *K*. Clotting time rises and falls with the prothrombin time. In the present study the prothrombin time of 23 premature infants and 189 controls was estimated at frequent intervals. Prothrombin deficiency occurred from the forty-eighth to the seventy-second hour after birth more frequently than at other times. Prothrombin deficiency was more marked in the winter months. This was probably due to a lack of vitamin *K* in the diet of pregnant mothers. Investigations also showed

that hæmorrhage from birth injuries was more marked during these months. Comparison of 219 controls with 400 infants treated with vitamin *K* showed that vitamin *K* controlled hæmorrhage in the new-born very efficiently. One cubic centimetre of natural vitamin *K* concentrate (or its equivalent 2-methyl-1, 4 naphthoquinone) given daily to the mother for ten days before labour will prevent prothrombin deficiency, and 0·5 cubic centimetre given immediately after birth and at the end of twenty-four and forty-eight hours will also prevent it in the infant.

The Diagnosis of the Cause of Obstructive Jaundice.

T. R. WAUGH (*The American Journal of the Medical Sciences*, November, 1940) describes a method for determining the cause of obstructive jaundice by the study of the blood alone. Once it has been found that the amount of bilirubin in the plasma exceeds 0·75 milligramme per 100 cubic centimetres and that there is a prompt direct reaction to the Van den Bergh test, provided that the patient is not pregnant or a young child or suffering from acute infection, extensive malignant metastasis in the liver or anæmia or blood disorder in which the jaundice is distinctly of secondary importance, the Takata-Ara test is applied to the serum. If the serum reacts to this test (faint reactions being ignored), the diagnosis is considered to be cirrhosis of the liver. If there is no reaction to the Takata-Ara test, the number of neutrophile leucocytes per cubic millimetre of blood and the sedimentation rate are next considered, the leucocyte count being made with great care during a particular part of the forenoon. If the neutrophiles number less than 3,000 per cubic millimetre (or if the neutrophile cells number between 3,000 and 4,500 in the presence of a normal sedimentation rate) the diagnosis is considered to be catarrhal jaundice. If still no diagnosis has been made, the number of lymphocytes per cubic millimetre of blood becomes important. If the lymphocytes number more than 2,000 per cubic millimetre the diagnosis is considered to be cholelithiasis; if they number less than 2,000 the diagnosis is considered to be cancer; the number is seldom close to the border line. This scheme yielded the correct diagnosis for 61 out of 70 patients for whom it was tried. Sometimes patients suffering from acute cholecystitis present the blood picture of cancer, but the clinical signs readily suggest the true diagnosis.

Toxic Cutaneous Eruptions after Antisyphilitic Therapy.

G. HORNE AND H. SCARBOROUGH (*The Lancet*, July 20, 1940) advance evidence to show that erythema and dermatitis occurring after the administration of arsenic and bismuth in the treatment of syphilis are associated with low capillary resistance. They describe a case of toxic purpura and one of toxic erythema in which treatment was carried out with vitamin *P* with results tending to confirm the observation that this substance helps to increase capillary resistance.

The Peripheral Circulation.

B. LIEBEL (*British Heart Journal*, July, 1940) describes a new means of examining the state of the peripheral circulation. The vascular bed of the part to be examined, usually a digit, is transilluminated. The rhythmical changes in the intensity of the emergent beam, which run parallel in time and quantity with the ebb and flow of the blood circulating through the transilluminated tissue, are recorded when the beam is converted into electrical energy by a photo-electric cell and the current so produced is recorded on an ordinary electrocardiograph. The author presents a series of typical records made with his apparatus.

Cardiac Damage in Rheumatism.

MORTON G. BROWN AND LOUIS WOLFF (*The New Zealand Journal of Medicine*, August 15, 1940) present a report calling attention to patients who, in spite of repeated and severe attacks of rheumatic infection, have no permanent cardiac damage. Their study was based on 175 consecutive unselected patients admitted to hospital with acute rheumatic fever, with or without chorea, and all of whom were reexamined repeatedly in the hospital out-patient department later, for periods between four and eleven years. The final opinion of their cardiac status was based on the physical examination, the electrocardiogram, the radiographic film of the heart, and the fluoroscopic examination for chamber enlargement. The incidence of those escaping permanent cardiac damage in this series was found to be 50%, the average age at the time of the first attack in these being thirteen years, and the follow-up period averaged seven years. The authors noted no constant relation between the severity of the illness, or the number of recurrences, and the development of cardiac damage. They also observed that patients who showed no permanent organic heart changes following the first attack of rheumatic fever are prone to escape permanent injury, despite further attacks, and they state that the final evaluation of the state of the valves must be delayed for several years after an attack of rheumatic fever.

The Leucocyte Count in Pertussis.

CHEN-TING CH'IN (*The Chinese Medical Journal*, July, 1940) reports the results of the estimation of the white blood cell count in whooping cough from a study of 266 child sufferers in an epidemic in China in 1939. Leucocytosis was observed in 96·0%, and lymphocytosis in 95·9% of the whole series. The highest leucocytosis and lymphocytosis occurred in the late catarrhal or active paroxysmal stage of the disease, and the increase of lymphocytes was found to be more or less parallel with that of the total leucocytes. The author states that a careful leucocyte count, both total and differential, should be made in all cases of suspected pertussis, and that if leucocytosis and lymphocytosis are demonstrated, they are of confirmatory value in the diagnosis.

Sinusitis and Bronchiectasis.

ROBERT L. GOODALE (*The New England Journal of Medicine*, October, 24, 1940) presents the results of a study of the relation of sinusitis to bronchiectasis in a series of 150 patients. He states that sinusitis is a common accompaniment of bronchiectasis; it may be present at the onset of the chest infection, or it may appear or at least be recognized later when it is a vital factor in the patient's disability. The author tabulates the results achieved for his patients by lobectomy with and without sinus surgery, and subdivides his cases into four groups of procedure. In the first group the sinuses were not affected and lobectomy was performed for the bronchiectasis; in the second group the sinusitis present was not surgically treated, but lobectomy was performed; in the third group the patients received surgical treatment for sinusitis and lobectomy; and in the fourth group the sinuses were operated upon and the chest condition was unsuitable for lobectomy. The author states that patients with bronchiectasis suitable for lobectomy but uncomplicated by sinusitis have the best results; those with sinusitis may have considerable sputum from the upper respiratory tract even after lobectomy; those unsuitable for lobectomy have manifested local improvement and in cases of mild bronchiectasis the chest symptoms have lessened with surgical treatment to the sinuses only. The author does not suggest that sinus surgery will be followed by eradication of the bronchiectatic cavity, and states that it is not an alternative to lobectomy when the latter is advisable.

Menorrhagia in Girls and Thrombocytopænic Purpura.

H. L. GOLDBURGH AND B. A. GOULEY (*The American Journal of the Medical Sciences*, October, 1940) produce evidence to show that menorrhagia occurring soon after puberty, associated usually with irregularity of the cycle, may be the first indication of thrombocytopænic purpura. They recommend that the blood platelets should be counted and the bleeding time determined whenever menorrhagia occurs in adolescent girls. These tests should be repeated despite initial normal findings if the menorrhagia continues.

The Electrocardiogram in Acute Coronary Occlusion.

S. STRAUSS (*The American Journal of the Medical Sciences*, October, 1940) reports five cases in which the diagnosis of acute coronary occlusion was clear clinically from the beginning of the illness, although there was a lag of several days in the appearance of the characteristic electrocardiographic changes.

Chronic Mastitis.

H. J. B. ATKINS (*The Lancet*, October 5, 1940) describes the treatment with œstrogens or androgens of 212 women suffering from chronic mastitis, that is to say, from "pain or lumpiness of the breast not due to bacterial inflammation, newgrowth or fat necrosis". The administration of œstrogens in doses sufficiently large to affect the breast was found to be harmful and it was thought that the histological changes were advanced. Androgens were found to alleviate as a rule the symptoms of chronic mastitis, but the benefit was not permanent and such undesirable by-effects as hirsuties, change of voice and amenorrhœa occurred in some patients. The histological changes produced in the breast by androgens in doses up to the limit of tolerance were insignificant, but a cancer of the breast developed in one patient ten months after a course of injections of testosterone propionate.

A. W. SPENCE (*The Lancet*, September 28, 1940) found that eight women suffering from chronic mastitis were all relieved of their pain by mammary inunctions of an ointment containing testosterone propionate and in none did hairiness or amenorrhœa occur.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Western Australian Branch of the British Medical Association was held on November 20, 1940, at the Perth Hospital, DR. J. P. AINSLIE, the Acting President, in the chair.

A Plan for Racial Health.

DR. STANLEY BOYD read a paper entitled "A Plan for Racial Health" (see page 285).

DR. F. W. CARTER said that if one thing had been stressed by Alexis Carrel, it was the utter futility of the present trend towards the physical, as distinct from the metaphysical (spiritual) side of man, as the solution of racial difficulties. Carrel had written in the following terms:

> It is not wise to follow blindly the doctrines of physicians and hygienists whose horizon is limited to their speciality—that is, to one aspect of the individual. . . . The progress of man certainly will not come from an increase in weight, or in longevity.

The science of eugenics was of importance to the future of the race, and its teaching had to occupy a relatively high position in the medical curriculum of the near future. The general practitioner was the ideal medium through which popular instruction in the subject might be promulgated, and ample opportunity would be given to him under a scheme of national health insurance such as that which had been suggested by the Federal Council of the British Medical Association in Australia, and which was now in the hands of the Branches for consideration.

Dr. Carter said that he wished to take the opportunity to introduce the scheme to the meeting. It was recognized that legislation directed towards socialization of medical services was inevitably coming, and that the only sound way of preparing for the emergency was to thrash out beforehand what was to be the official and combined attitude of the profession when faced with such legislation. He asked that every doctor should study the document and write down his suggestions so that they might be embodied in the scheme if possible. He urged the profession to forsake its individualistic attitude regarding this and other matters of general application, and to be prepared to accept the expressed view of the majority. In this respect the medical profession had much to learn from trades union organization. The chief reason why Dr. Carter and others opposed the setting up of a professionally owned system of practice, like the Ontario Medical Services Incorporated, was that such a system did not make provision for people in such levels of society that they could not afford the necessarily large premiums. The medical profession must take full advantage of the principle of insurance, whereby in the spreading of the risk over the largest number of contributors individual costs would be minimized. A voluntary plan would be a negation of this principle, and in addition it would defeat what in Dr. Carter's opinion was the sound principle of including all persons with incomes below a stated level, or even that of including every person in the State, under the legal necessity of contributing. He did not think that the profession should be asked to accept continued responsibility for those members of the community who were unable to contribute any sum, however small, for medical services; their inclusion in the scheme would involve the Government—in other words, the people generally—in an annual grant equal to the sum of their contributions.

Dr. Carter then read portions of the official scheme which he felt could be made to meet the needs of the public and the views of Dr. Boyd. He thought that modifications would have to be made to meet the requirements of a continent of immense proportions and widely scattered population; these should not conflict with the general principles laid down. Dr. Carter agreed with Dr. Boyd in his desire for a service, payment for which would not be directly proportionate to the amount of sickness treated, but would rather lend itself to gain (in the form of leisure for recreation and study), and would be associated with that enhanced good health of the participants which was incidental to active adoption of the preventive side of medical practice. In conclusion, Dr. Carter expressed appreciation of Dr. Boyd's paper.

DR. J. J. HOLLAND said that he doubted the ability of the profession to overcome the sexual instincts of human kind. He asked how they were to prevent it happening, as in France and in other European countries, that there were "more coffins than cradles".

DR. W. H. NELSON spoke of the problem which was presented by the fact that the medical profession was learning to cure such diseases as *dementia præcox*. He wondered what would become of the race if persons cured of such diseases were allowed to procreate, and whether it was safe to leave the solution to nature.

DR. H. J. GRAY referred to the difficulty discussed by Dr. Holland and to the lectures being given to troops going abroad, instructing them in regard to the dangers of venereal diseases in countries to which they were being sent.

DR. M. KASNER MOSS referred appreciatively to the literary character of the address, and drew attention to the contrast between the idealistic attitude of Dr. Boyd and the eminently sound common sense of Dr. Carter, who had opened the discussion and who had not ignored the necessary considerations of "£ s.d.". Dr. Moss dissented from the statement made by Dr. Boyd that a will to recover was necessary to a cure, and instanced people who had attempted suicide and had been saved by treatment, only to make other attempts upon their own lives.

DR. A. N. JACOBS referred to the account of socialized medicine in the Soviet Union written by Dr. Sigerrist, professor of medical history at Baltimore, and an authority with a real mastery of his subject. Dr. Jacobs strongly urged medical men to read that book, and asserted that, with modifications, a nationalized medical service would satisfy Dr. Boyd, the Australian people and members of the medical profession. Dr. Jacobs emphasized the benefits to the doctors which accrued in Russia from the official provision of repeated opportunities of refresher courses, and the value to outlying districts of the arrangement which sent to them the youngest and most brilliant of the newly qualified doctors, who were officially required to serve there for the first five years before undertaking any specialized form of practice to which they were drawn after that period. There was in the Russian system full scope for individuality in a professional sense, contrary to what superficial observers might think would obtain in a government service. Dr. Jacobs moved that a copy of the British Medical Association scheme be made available to every doctor in the State.

Dr. Carter said that the ultimate intention of the Federal Council of the British Medical Association in Australia was the publication of the scheme for public information. In the meantime it had been issued to Branches for criticism and for the working out of details. There were many gaps to be bridged, and the final presentation should be such as to offer a practical solution of the many difficulties that lay in the path of a Commonwealth-wide medical service. The document, therefore, for the present was to be considered a private one, as far as its publication in the lay Press was concerned.

It was decided to make a copy available to any member applying for one, and in addition it was decided that each country association should be supplied with a copy.

DR. B. C. COHEN criticized the view that birth control was to be considered a danger, and doubted that it could be even modified by the advice of doctors. He asked whether it was to be considered a disadvantage, because it was undoubtedly being used to reduce the numbers of children born. In his view its use was for the benefit of the race, because serious people used it for the securing of quality of offspring as contrasted with quantity.

DR. W. J. BEVERIDGE pointed out that some national scheme was required, if proper provision was to be made for the small bush districts. The present arrangements were completely inadequate, and men had to be paid properly if these outlying towns were to be enabled to have an efficient medical service.

Dr. Boyd, in reply to Dr. Moss's remarks on suicide, said that psychology had shown that many of the dominating motives of human activity had been proved to be unconscious and that those people who had attempted suicide had recovered because the shock of the realization of their attempt had brought the impulse to recovery, which had been latent, into action. Dr. Carter had made out a convincing case for the nationalization of the whole of the medical services of the people, consultant as well as general. Dr. Boyd protested that human nature was proving itself capable of being educated, and that its natural educators were the members of the medical profession. He thought that his whole paper proved that his prime desire was quality in offspring, and that he looked upon birth control as a necessary and natural part of the growth of the sense of personal responsibility for the welfare of the offspring, and appealed only for a logical development of scientific instruction for the purpose of perfecting this natural impulse.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on October 9, 1940, at the Children's Hospital, Carlton, DR. H. DOUGLAS STEPHENS, the President, in the chair. The meeting took the form of a series of clinical demonstrations by members of the society. Part of this report appeared in the issue of February 22, 1941.

Cretinism.

DR. L. P. WAIT showed two patients to illustrate the clinical features of cretinism. The first, a boy, aged three years, was regarded as a typical cretin. He had always been backward; he did not sit up until he was eight months old, stand till he was eighteen months old or walk till he was twenty-one months old, and he was unable to feed himself. He was very placid, rarely cried and was habitually constipated. Dr. Wait drew attention to the unusually large size of the testes, and showed in skiagrams of the long bones that the appearances at the epiphyseal ends were those described as occurring in cretinoid children. When the boy was admitted to hospital on September 10 he weighed only thirty pounds and the hæmoglobin value was estimated at 60%. Treatment was initiated by the administration of thyreoid extract, one-twelfth of a grain twice a day for a few days, and the dosage had been steadily increased to one grain three times a day.[1]

Dr. Wait also showed a girl, aged three years, who had been in his care since August 11, 1939. The child was born post-maturely on October 2, 1937, after induction of labour; her birth weight was ten pounds, and there were no other children in the family. The child had been constipated from birth; the tongue was large and tended to protrude, and the teeth were late in appearing; she always seemed to be cold; and, though she was unable to walk when she came into his care, the child could talk quite well and seemed to be reasonably intelligent. Dr. Wait went on to say that when he first examined her the child was pale and had a large head (circumference 20 inches), and the anterior fontanelle was widely open; supraclavicular pads of fat were present; the abdomen was large and protuberant, but there was no umbilical herniation. He had made the diagnosis of cretinism and commenced treatment with one-quarter of a grain of thyreoid extract a day for one week and then twice daily for a week. By that time the mother had noticed a great change in the child; she was much brighter and the constipation was cured. He had increased the dosage to one-quarter of a grain three times a day, and the child's condition had improved rapidly in every respect. He had noted on July 12, 1940, that the fontanelle had practically closed. The dosage of thyreoid extract was increased until the child obtained two grains a day, which appeared to be sufficient for her; she had also had an adequate supply of vitamin *D* throughout the treatment.

Dr. Wait asked for a discussion on the treatment of cretinism. He advocated the initial use of small dosage, as most cretins were sensitive to thyreoid extract and fatalities had been reported to have occurred after large dosage; satisfactory results were obtainable in a shorter time by steady progression from initial small dosage. Dr. Gardiner-Hill, of Saint Thomas's Hospital, London, used an average daily maintenance dose of between one grain and one and a half grains of *thyreoidea sicca*; he had also pointed out the danger of thyreotoxæmia with acute infection, and withheld thyreoid treatment during infective illnesses; with absorption of the myxœdematous tissue it was necessary to carry out auxiliary treatment to prevent rickets. Finally Dr. Wait mentioned that the abnormal sexual development was corrected by early and adequate treatment; that observation was of special interest with regard to the gross hypertrophy of the testes of the boy he had shown that night.

DR. JOHN WILLIAMS said that the boy was just above the level of imbecility; it was important to have the mental development estimated scientifically; the mental growth with thyreoid medication was unsatisfactory.

DR. J. W. GRIEVE drew attention to the necessity of taking into account the bone age, the height age and the mental age when dosage was being assessed. He thought the members of the society would be interested in an article by Wilkins which had appeared recently in *The Journal of Pediatrics*; that article contained graphs relating to cretins, from which it could be seen that, with appropriate treatment, the height age and the bone age advanced much more satisfactorily than did the mental age.

DR. H. BOYD GRAHAM reminded the members of the way in which the late Dr. A. Jeffreys Wood used to insist on the importance of great care in the administration of thyreoid gland extracts in the treatment of cretinism. Dr. Wood, as far back as 1920, was in the habit of drawing attention to the advantages of small initial dosage cautiously and gradually increased. Dr. Graham said that the danger of rickets was a real one, even in the climate and environment of Melbourne; he had had the unfortunate experience of having in his care at the hospital a patient with cretinism, whose vertebral column had become considerably softened with the production of a pronounced thoraco-lumbar kyphosis; this had necessitated long months of treatment at the Frankston orthopædic branch.

DR. GUY SPRINGTHORPE said that he understood that mental development improved satisfactorily if specific treatment was started early in infancy.

DR. H. J. SINN reminded the members of the series of patients with cretinism that he had presented at the meeting on May 8, 1940, with the object of focusing attention on cretinoid epiphyseal dysgenesis. It was reasonable to assume that large thyreoid dosage produced premature union, impeding growth in height. At times the mental development did not vary with early and adequate treatment; mental development might depend on intelligence and inheritance and on accompanying aberrations, such as intracranial injury or fœtal life; it could be asserted with confidence that the mental age development did not necessarily depend on adequacy of treatment. He added that a caution was necessary about the description of dosage; they should know what they were giving; since 1932 the dosage strength had been increased, and in any case the dosage in terms of dry gland was as much as five times stronger than the same dosage in terms of fresh gland.

Dr. Stephens, in calling on Dr. Wait to reply, inquired whether anything had been done recently about gland transplantation. The Italians had advocated the insertion into the pectoral muscles of thin slices of thyreoid gland tissues; Dr. Stephens had attempted the treatment twice without any apparent benefit to the patients.

Dr. Wait, in reply, said that he regretted he had no information for Dr. Stephens about gland transplantation. He also said that it was stated in Thomson and Findlay's text-book that treated cretins never actually caught up with normal individuals, though some were able to be satisfactory members of society. In conclusion he emphasized the importance of accessory treatment, such as extra iron therapy and an adequate amount of vitamin *D* in the diet or by separate administration.

Reviews of Surgical Cases.

DR. J. G. WHITAKER said that he wished to supply information to the members of the society about four patients, two of whom had previously been shown at meetings. One girl, aged almost nine years, suffering from exophthalmic goitre, who had been shown by Dr. Grieve at the meeting of the society on April 10, 1940, had been submitted by him to subtotal thyreoidectomy on July 15, and after an uneventful recovery had been discharged from hospital on August 23. Dr. Whitaker showed the child to demonstrate the great improvement in her condition. On May 29 the basal metabolic rate had been estimated as + 35%. Before operation she was given sedative treatment with "Luminal" and chloral hydrate; she had had rubella and catarrhal jaundice.

Another girl, aged nine years, who had been shown at the meeting on July 10 by Dr. Grieve, had had an intrathoracic tumour. She came to operation on August 12, and Dr. Whitaker found a mediastinal tumour which it was not practicable to remove. The girl died a few days later, and at the autopsy a large sarcoma was exposed. Dr. Whitaker asked Dr. Reginald Webster to comment on the sarcoma.

Dr. Whitaker also gave an account of the history of a male baby, who had been admitted to hospital on September 23, 1940, when aged eighteen days. The baby was born two weeks prematurely, and though his birth weight was six pounds six ounces, his weight on September 23 was only five pounds four ounces. For three days after birth he had vomited small amounts; the vomiting seemed to be unconnected with the feedings. From September 18, vomiting had become more troublesome and was at times projectile in type. No natural bowel actions had occurred, and nothing but meconium was obtained in the material returned after enemata. For five days the baby was fed on breast milk and then artificial feedings with diluted "Nestlé's Condensed Milk" had been used. At the time of his admission to hospital the baby was dehydrated, with

[1] On October 10 the boy weighed 28 pounds 9 ounces and the hæmoglobin value was 70%; and on November 1 the weight was 26 pounds and the hæmoglobin value 92%.

slight abdominal distension; but no abdominal tumour was palpable. After the intravenous administration of 5% glucose in normal saline solution at the rate of one drachm each hour for two days, Dr. Whitaker had performed laparotomy and had found that the stomach and duodenum were greatly distended and all the intestines were collapsed. Death had not occurred until October 2. At the autopsy an extreme degree of stenosis of the duodenum was found at the site of entry of the common bile duct, a pin-hole opening being the only communication between the upper dilated portion and the collapsed lower portion of the duodenum. The bile duct entered the lower collapsed portion of the duodenum. Dr. Whitaker commented as a point of interest on the fact that the baby had survived an abdominal operation and lived for twenty-seven days.

Dr. Whitaker also showed a boy, aged twelve years, on whom he had operated for carcinoma of the rectum. The boy was admitted to hospital on July 29, 1940, on account of intractable diarrhœa, with the passage of blood and mucus and only a little fæcal material during the preceding month or two. He had complained of tenesmus and his general health and appetite had become poor. A large, hard, fixed and indurated mass, which bled easily, was palpable at the upper end of the rectum. On August 1 Dr. Whitaker had removed a portion of the mass for biopsy examination, and it was found to contain scirrhous carcinomatous tissue. On August 5 colostomy was performed, and on August 29 Dr. Whitaker had partially resected the rectum. He had been unable to detect the presence of any secondary deposits in the liver at the time the colostomy was performed, and at the time of the meeting the patient had recovered from the operation and was able to sit out of bed. Dr. Whitaker thought that members would be interested to see the boy, as the condition was not common at so early an age.

DR. REGINALD WEBSTER, with reference to the microscopic sections he had prepared from the material removed by Dr. Whitaker at the operation of subtotal thyreoidectomy, said that he had found in them the classical histological features of exophthalmic goitre: (i) the tendency to the formation of multiple abnormally small acini, in which the epithelium was flattened and the colloid was very deficient or even absent; and (ii) another manifestation of epithelial hyperplasia—the development of papillomatous ingrowths into the larger acini, the epithelium of which was columnar. Dr. Webster said that those features were illustrated in the slides he had prepared, and the unmistakable epithelial hyperplasia and deficiency in colloid amply confirmed the clinical diagnosis; the colloid content was not so conspicuously diminished microscopically as the macroscopic appearance would have led him to expect.

With reference to carcinoma of the colon in childhood, Dr. Webster recalled a former instance. The patient, a girl, was in Dr. C. H. Osborn's care in 1933. She had subacute obstruction requiring colostomy, and the presence of carcinoma of the sigmoid colon was established at operation and by histological examination; the patient had returned to the hospital four years later with secondary deposits in the cerebellum.

Dr. Webster reminded the members that the great James Ewing, in discussing carcinoma of the colon, had spoken of the "considerable number of cases occurring in children" ("Neoplastic Diseases", 1919, page 646). In Allbutt and Rolleston's "System of Medicine" (Volume III, 1907, page 748), the subject was discussed, and *inter alia* it was stated there that Nothnagel had quoted instances occurring at seventeen, twelve, eleven, and even three years of age. The biopsy specimen obtained from the patient shown by Dr. Whitaker was an illustration of the limitations of biopsy examinations; two tiny scraps of material arrived at the pathological department, in one of which he could find nothing but normal tissue, though in the other he found a few fields establishing the presence of a carcinomatous process of the scirrhous sclerosing type. Dr. Webster added that C. H. Phifer ("Cancer of the Rectum and Sigmoid in Childhood and Adolescence", *Annals of Surgery*, Volume LXXVII, 1923, page 711) had collected from the literature 49 cases of cancer of the rectum or sigmoid in persons under twenty years of age. When carcinoma occurred in young subjects there was usually an antecedent polyposis or adenomatous hyperplasia of the intestinal mucous membrane alone; but Dr. Webster had found insuperable difficulties in tracing the development of carcinoma in juvenile subjects of polyposis, and had never known one such polypus to exhibit malignant properties, though rectal polypi removed operatively were not infrequently sent to his department for microscopic examination.

With reference to the mediastinal tumour, Dr. Webster said that it had been hard to get the histological detail; the exploratory operation had caused interstitial hæmorrhages which rendered the tissue necrotic by the time the patient died. The tumour might yet be found to be teratomatous; but at that stage he could report that it was a highly malignant connective tissue tumour of the mediastinum.

Dr. Webster concluded his remarks by observing that all degrees of duodenal atresia or stenosis were represented by specimens in the museum of pathology at the hospital. As a rule stenosis or atresia occurred distal to the point of entry of the bile duct, and the presence of bile in the vomitus was indicative of duodenal stenosis in contrast to pyloric hypertrophy.

DR. H. J. SINN said that in the course of his work as lecturer to fourth year medical students on the pathology of the respiratory system, he had come across the statement that giant-celled sarcoma of the mediastinum was innocent, as it did not metastasize; it had the histological appearances but not the clinical features of sarcoma, and usually attained "giant" dimensions.

DR. J. W. GRIEVE enumerated some of the main features of the clinical history of the girl who had had toxic goitre. He said that Dr. Whitaker had consulted Dr. N. M. Harry before reaching the decision to operate, and that the operation had been decidedly beneficial. Dr. Grieve thought that the mediastinal tumour was probably a dermoid; an interesting feature was the erosion of the rib. Finally, he commented on the period of survival of the baby with duodenal atresia; he had seen several instances of survival for two or three weeks without special treatment.

Dr. Stephens asked for information concerning the preoperative establishment of the diagnosis of duodenal atresia, and said that he had had several patients who had lived for a long time. He had also had the experience of finding at operation a huge dilatation of the duodenum. He was thoroughly in agreement with Dr. Webster that the presence of bile in the vomitus was suggestive of atresia; but he had found bile to be present in at least one case of pyloric stenosis.

Dr. Stephens said that carcinoma in the rectum of a child must be very rare; he could remember only one other example in his experience. The frequent passage of blood was characteristic of polyposis, but might arise from carcinomatous tissue, the site of which was beyond the reach of a finger in the rectum. He was not clear as to whether Dr. Whitaker's patient had originally suffered from hæmorrhage as well as from constipation, but he understood that wasting was not an early feature.

Dr. Whitaker, in reply, said that the diagnosis of atresia of the duodenum had rested on the occurrence of vomiting of the projectile type, dilatation of the stomach and radiographic evidence of obstruction in the pylorus or duodenum, about which Dr. Hallam could give further information. Dr. Whitaker took the opportunity of emphasizing the great advantage of operating on babies with pyloric or duodenal obstruction under local anæsthesia of the abdominal wall. In the case of carcinoma of the rectum, the main presenting symptom was constipation; hæmorrhage as a primary sign was not a feature.

Dr. Hallam said that he could not remember the exact details; but the stomach was very large, and the delay in emptying amounted to almost twenty-four hours. He recalled an extreme case in an adult, in which barium had been retained in the stomach for seven days; this had proved to be due to spasm. With the patient under general anæsthesia the surgeon at operation had been able to pass a finger through quite readily; the narrowing was extrinsic, but the outcome of the operation was cure of the patient.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING of the Medical Sciences Club of South Australia was held at the University of Adelaide on September 6, 1940.

The Neuro-Muscular Transmission of Motor Impulses.

DR. POSENER read a paper on the neuro-muscular transmission of motor impulses. He stated that the theory of the so-called cholinergic transmission of motor nerve impulses to the muscle assumed the destruction of the transmitter acetylcholine, liberated at the nerve end plates by the enzyme cholinesterase, which was supposed to be accumulated at the end plates too. In support of this conception a striking parallelism between end plate development and cholinesterase concentrations in fœtal muscles could be demonstrated. But, on the other hand, active movements were observed in rat embryos before end plates were established.

The punctate aggregation of cholinesterase at the motor nerve terminals was independent of both motor and sympathetic impulses, but was probably due to specific adsorption.

The process of enzymatic destruction of the transmitter was specifically checked by eserine, was diminished in muscles of thyroxinized animals, but was unaffected by curare. Injections of high esterase concentrations into the densely innervated portion of sartorius muscle did not produce a "myasthenia blockade" to motor muscles.

The Science of Nutrition and the Feeding of Armies.

MR. H. R. MARSTON read a paper entitled "The Application of Recent Advances in the Science of Nutrition to the Feeding of Armies". He stated that recent accessions to our knowledge of accessory food factors had provided a very much sounder basis for army rationing than was available during the last war, and if our present knowledge, which admittedly was still very imperfect, was applied with reasonable care there was little danger of any outbreak of disease which had its origin in nutritional deficiency.

Certain physiological responses to dietary constituents were being exploited in order to render more efficient the personnel of special branches of the service. Of these, perhaps the most important was the very material increase of visual acuity in light of low intensity which followed the ingestion of relatively massive amounts of vitamin *A* or of its carotinoid precursors. The fact that night blindness was the first obvious symptom to appear in vitamin *A* deficiency was widely appreciated. The 2,000 odd international units of vitamin *A* present in what would be considered a normal dietary as a rule did not by any means provide sufficient visual purple to ensure the maximum efficiency of visual adaptation of which the human retina was capable. This maximum seemingly is reached about 8,000 international unit intake level.

Although a great number of analyses of vitamin *A* and precursor carotinoids were available in the literature, many of these did not provide a reliable guide in the assessment of the order of the vitamin *A* in a diet. Of the thirty odd known carotinoids, only four had the capacity to form vitamin *A*, while some of the analytical methods did not distinguish quantitatively between the vitamin *A* precursors and carotinoids which were inert in this respect. The appraisal of rations for vitamin content was by no means a job for amateurs.

Mr. Marston outlined briefly the effects which various means of cooking exerted on the thermolabile vitamins and ascorbic acid and thiamin, and pointed out that outbreaks of active scurvy might result from the means adopted for cooking. The potato ration as a rule provided adequate vitamin *C* for normal requirements. Up to 70% of this might be destroyed by means generally employed in army cooking. This destruction might be obviated very simply if the existing knowledge was intelligently applied.

THE AUSTRALIAN AND NEW ZEALAND ASSOCIATION OF RADIOLOGY.

A MEETING of the Australian and New Zealand Association of Radiology was held at Sydney on October 18, 1940.

DR. K. E. SHELLSHEAR and DR. B. P. ANDERSON STUART presented a paper entitled "Photofluorography: The Use of the Miniature Film in X-Ray Diagnosis". MR. HOWARD B. GOUGH read a paper entitled "Photofluorography". These papers were published in the issue of March 1, 1941. By an oversight the remarks of Dr. Bruce White, who opened the discussion, were not published with the papers.

DR. BRUCE WHITE said that he wished to show two rolls of films of members of the Australian Imperial Force by way of comparison with those already shown and because they had considerable bearing on his remarks. He said that these films were taken with a self-rectified unit, and to his mind had been absolutely diagnostic. The standard of clarity had varied quite considerably from time to time, and in most cases where the quality was poor it was found that the human element was at fault.

Dr. White then showed a list of abnormalities found as a result of the 35-millimetre film examination of approximately 40,000 men. The list had been prepared with the help of his colleagues Dr. Cotter Harvey and Dr. W. L. Calov. There were 365 cases in which there was evidence of past and present gross tuberculous disease, or 9·1 per 1,000 cases. He thought that these figures absolutely justified the adoption of fluorophotography as a routine in the examination of recruits. At times it had been reported that such-and-such a man was in the army and that he was suffering from pulmonary tuberculosis. In every case a check had revealed that the man's condition had been noted on the small film and that the reason for his presence in the army lay elsewhere. Undoubtedly a few cases of minimal tuberculosis might be missed, and again some men would develop tuberculosis no matter what X-ray examination was made. He thought that the numbers missed would be very small, but time alone would decide.

One outstanding impression was that most abnormalities were, if anything, exaggerated on the small film. There was certainly not the clarity of detail as in a large standard film; but in view of the exaggeration of abnormalities, he did not think they would be missed in the small film.

Dr. White said that they must all continue to bear in mind that the shadows seen, whether taken on a 35-millimetre, a 5 by 4, or a large film, had to be interpreted in pathological terms. He regarded radiology as one step in the diagnosis of lung lesions, undoubtedly the most important of any single examination. But the shadows seen represented some abnormal pathological process, and, provided they were sufficiently clear to be interpreted in pathological terms, he was not concerned with the method of production. By this he did not mean that the best possible radiological results should not be obtained. He regarded the 17 by 14 film, such excellent examples of which had been shown, as the standard ideal, and he thought this could not be replaced for general critical work.

Frankly, he had been disappointed with 5 by 4 films. He thought some slight adjustment in the camera or other mechanism or possibly some change in technique might be necessary. Samples from America, which he had seen in December, 1939, he thought were a true indication of the value of this unit. Comparative technical points were matters for discussion by his radiological colleagues; but it seemed to him that the 35-millimetre film of the standard shown by Dr. Anderson Stuart and Dr. Shellshear was all that was necessary for diagnostic work in mass survey, that the 5 by 4 film had no advantage over this and, furthermore, the 35-millimetre film was definitely much cheaper.

He wished to thank the association for the invitation to be present and for the excellent demonstration and papers given.

THE MEDICAL DEFENCE SOCIETY OF QUEENSLAND.

THE annual meeting of the Medical Defence Society of Queensland was held on February 6, 1941, at B.M.A. House, 225, Wickham Terrace, Brisbane, DR. ALEX. H. MARKS, the President, in the chair.

Annual Report and Financial Statement.

The annual report of the Council and the financial statement for the year ended December 31, 1940, were presented and adopted on the motion of Dr. Alex. Marks, seconded by Dr. S. F. McDonald. The report is as follows:

The Council has pleasure in presenting the following report of the Medical Defence Society of Queensland for the year ending December 31, 1940.

Membership.

The total membership of the Society is 387, exclusive of 14 members whose subscriptions for 1940 have not been paid. Our gains have been as follows: new members 23, members reinstated 8, making a total of 31. Our losses have been: resignations 2, left the State 10, deceased 3, unfinancial 14, making a total of 29. As last year's membership was 385, a total gain of two members has resulted during the year.

It is with regret that we record the death of the following members: Dr. Adela Porter and Dr. V. Beresford Taylor, of Brisbane, and Dr. G. R. Woodhead, of Maryborough.

Office Bearers and Council for 1940.

The following office bearers were elected:

President: Dr. Alex. H. Marks.
Vice-President: Dr. S. F. McDonald.
Honorary Secretary: Dr. Neville G. Sutton.
Honorary Treasurer: Dr. R. G. Quinn.
Councillors: Dr. A. G. Anderson, Dr. Gavin H. Cameron, Dr. G. W. Macartney, Dr. Horace W. Johnson, Dr. G. P. Dixon, Dr. Kenneth Wilson, Dr. L. P. Winterbotham.

The retiring councillors were Dr. S. F. McDonald, Dr. Kenneth Wilson and Dr. Gavin H. Cameron, all of whom were reelected. Dr. H. S. Waters tendered his resignation as a member of the Council and Dr. G. P. Dixon was appointed to fill the vacancy.

In May last Dr. Kenneth Wilson resigned as a member of the Council, owing to his departure on active service with the second Australian Imperial Force.

Subscriptions of Members on Active Service.

It has been decided by the Council that subscriptions of members on active service abroad be waived, and that their membership be suspended during the time of their absence from the State.

Members who are on full-time home military service were circularized and asked whether they wished to have their membership suspended.

Alien Medical Practitioners.

It has been resolved by the Council that no alien medical practitioners be accepted for membership of the Society for the duration of the war.

Proposed Indemnity Insurance.

Further correspondence has taken place with the London and Counties Medical Protection Society and the Medical Defence Union, London. The former society offered indemnity insurance at £2 2s. per member for a block of at least two hundred members, the amount of the indemnity being limited to £1,000 in any one case, or the sum of £2,000 in any one year. The ordinary rate payable by overseas members is £3 (sterling).

In view of the present international situation no further action has been taken in this matter.

Medico-Legal.

No cases were submitted to the Society during the year.

Finance.

The total assets of the Society are £5,495 11s. 2d. Income from investments amounted to £192 1s., and the sum of £231 19s. 3d. was received from entrance fees and subscriptions. The total income for the year was £426 5s. 9d., and the total expenditure amounted to £57 10s. 5d. The surplus of income over expenditure for the year was £380 2s.

(Sgd.) ALEX. H. MARKS,
President.

Election of Office Bearers.

Dr. E. R. Row, Dr. John Hardie and Dr. R. A. G. Malcolm were unanimously elected members of the Council.

Messrs. R. G. Groom and Company, chartered accountants (Australia), were reelected as auditors for the ensuing year.

Proposed Indemnity Insurance.

Correspondence which had been received from London regarding proposed indemnity insurance was discussed, but it was decided to defer any action during the present international crisis.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 31, of February 20, 1941.

AUSTRALIAN IMPERIAL FORCE.

Australian Army Medical Corps.

To be Brigadier (temporarily).—Colonel S. R. Burston, 1st July, 1940.

To be Major.—Captain G. N. Young, 1st July, 1940.

Colonel (Temporary Brigadier) S. R. Burston, C.B.E., D.S.O., V.D., from the appointment of Deputy Director of Medical Services, 1st Australian Corps, is appointed Director of Medical Services, Australian Imperial Force in the Middle East, 28th November, 1940.

Major N. W. Francis is appointed to command Special Hospital, 1st November, 1940.

To be Major.—Captain E. R. Crisp, 13th October, 1940.

To be Lieutenant.—Richard Valentine Hoile, 14th December, 1940.

To be Colonel.—Lieutenant-Colonel K. B. Fraser and to be Assistant Director of Medical Services, Headquarters, Australian Imperial Force in the United Kingdom, 20th June, 1940.

To be Colonel.—Lieutenant-Colonel J. E. Down, O.B.E., E.D., and to be Assistant Director of Medical Services (Dental), Australian Imperial Force in the Middle East, 1st January, 1941.

Colonel W. W. S. Johnston, D.S.O., M.C., E.D., is appointed Deputy Director of Medical Services, 1st Australian Corps, 10th January, 1941.

Colonel J. Steigrad is appointed Assistant Director of Medical Services Base and Line of Communication Units, 10th January, 1941.

Colonel K. B. Fraser is appointed to command an Australian General Hospital, 10th January, 1941.

To be Lieutenant-Colonel (temporarily).—Major K. W. Starr, 1st January, 1941.

Lieutenant-Colonel J. K. Adey, O.B.E., is appointed to command an Australian General Hospital, 10th January, 1941.

Lieutenant-Colonel F. H. Beare, E.D., is appointed to command an Australian General Hospital, 10th January, 1941.

To be Major.—Captain R. E. Chapple, 31st December, 1940.

To be Major (temporarily).—Captain S. Crawcour, 21st December, 1940.

Major H. McLorinan is appointed to command a Casualty Clearing Station, 10th January, 1941.

Major G. B. G. Maitland, D.C.M., is appointed to command a Field Ambulance, 10th January, 1941.

Major D. M. Salter is appointed to command a Field Ambulance, 10th January, 1941.

To be Captain.—Lieutenant T. J. White, 14th January, 1941.

AUSTRALIAN MILITARY FORCES.

EASTERN COMMAND.

Second Military District.

Australian Army Medical Corps.

Honorary Captains F. P. C. Claffy and R. G. Wright are appointed from the Reserve of Officers (A.A.M.C.), and to be Captains (provisionally), 31st December, 1940.

To be Lieutenant (provisionally) and Quartermaster.—Wilfred Roy Shaw, 23rd December, 1940.

To be Captains (provisionally).—Joseph Gregory Buckley, 8th January, 1941; Ernest Ambrose Marsden, 10th January, 1941; Herbert John Solomon, 11th January, 1941; and John Henry Drummond Edwards, 14th January, 1941.

Australian Army Medical Corps Reserve.

To be Honorary Captains.—Alexander William Wheatley Gray, 9th January, 1941; Macaulay Killick Winchester, 10th January, 1941; Austin Elvyn John, 13th January, 1941; Herbert Cyril Spencer, 14th January, 1941; and John Joseph May, 15th January, 1941.

To be Honorary Captain.—Henry Houghton Burton Bradley, 8th November, 1940 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 232 promulgated in *Commonwealth Gazette* No. 258 of 1940).

Captain B. H. Diamond is transferred from the Australian Army Medical Corps, 4th Military District, 9th May, 1940.

SOUTHERN COMMAND.

Third Military District.

Australian Army Medical Corps.

Colonel J. A. H. Sherwin, V.D., from the Unattached List, and Lieutenant-Colonel A. F. Jolley, from the Reserve of Officers, 2nd Military District, are appointed to command General Hospitals, 1st January, 1941.

To be Captains (provisionally).—David Evans Gowenlock, 21st June, 1940 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 140/1940, promulgated in *Commonwealth Gazette* No. 141 of 1940), Alan John Mark Nelson, 1st January, 1941, Geoffrey Arthur Goding, 2nd January, 1941, and Clifford Ernest Sawrey, 29th January, 1941.

Australian Army Medical Corps Reserve.

To be Honorary Captains.—Eric Nathan Rosen, Clive Francis Henry Pyman and Arnold Richardson, 29th January, 1941, and Douglas Robert Gauld, 31st January, 1941.

Correspondence.

ASTROLOGY.

SIR: A certain Sydney lay journal recently featured a denunciation of the vogue amongst the public to be gulled by professional astrologers. That the vogue is great is evidenced by the fact that but few papers still refuse to print an astrology column. The journal quoted police officers as to the alleged harm done to superstitious and neurotic people by the astrologists.

One has found a few patients who refer to their astrologer's prophecies and advice *re* their ailments. In each case it was found that the patient's knowledge of the most elementary facts concerning time was practically nil.

On taking an extract from the astrology column of a paper one pointed out to the patient that ". . . in giving time of

birth readers are advised to apply zone standard times according to the town in which they were born. . . ."

Assuming that there may be any truth in the statement that the position of the stars at birth affects the fortunes of earth dwellers, one points out that the use of zone standard times would make the astrologer's advice valueless.

For the position of the stars with relation to an observer on the earth is timed not by a man-made zone standard time conventionally adopted for commercial convenience, but by sidereal (or star) time which is simply defined either as the right ascension of the observer's meridian or the westerly hour angle of the first point of Aries.

The zone standard time of two persons, one living, say, at Sydney (New South Wales), and one at Wellington (New South Wales), about 200 miles west of Sydney, is the same, but owing to the difference in longitude, the "heavenly picture", that is, of the stars, at both places and at directly intermediate towns at the same instant of time is different. A two minute chat on these elementary facts leaves the patient convinced that the paper's astrologer is inconsistent on one important point at any rate and the pseudo-scientific halo surrounding the astrological bunk becomes somewhat dimmed—with possible benefit to the neurotic.

Yours, etc.,

KEVIN BYRNE.

"Lakemba Cottage", Lakemba,
New South Wales,
February 17, 1941.

LOCAL ANÆSTHESIA AND RETROSTERNAL GOITRE.

SIR: T. Maynard Furber's letter (THE MEDICAL JOURNAL OF AUSTRALIA, January 18, 1941, page 78) made me think of a similar case, details of which may interest your readers. The difficulties were of a different nature but no less serious than in Dr. Furber's case, but the use of local anæsthesia enabled us to cure the patient. The anæsthetist had declined to administer any sort of general anæsthetic by any means.

Mrs. P.D., sixty-four years, was very stout, and had suffered from dyspnœa and noisy breathing for ten years. During the three years preceding consultation these symptoms had become very alarming, and latterly confined the patient pretty well to her house. In addition marked dysphagia had developed. The face and neck were pale, puffy and slightly cyanosed, the veins of the neck were engorged, and breathing was noisy, even at rest in bed. The thyreoid gland was scarcely palpable in the neck. On X-ray examination of the chest a clearly defined spherical density was seen lying symmetrically in the superior mediastinum and reaching down to the level of the border of the third costal cartilages. The trachea was seen to be distorted and narrowed in its lower part. The cardiac reserve was thought to be minimal. There were no signs of toxic goitre. The mass was regarded as an adenomatous goitre and as suffocation seemed imminent an attempt at removal was thought proper. A two-stage operation was planned as the tumour appeared too large to be delivered into the neck through the thoracic inlet even if it proved to be a thyreoid adenoma.

In the first stage the *manubrium sterni* was separated from the body of the sternum and split in the middle line, after removal of the second costal cartilages. The cleft in the manubrium was jammed open with a piece of the cartilage. These procedures were carried out under morphia and hyoscine and "Percaine" solution with adrenaline infiltration. The intercostal spaces were blocked and the tissues above the sternum infiltrated. After the operation the colour and general condition improved considerably and after twelve days it was decided to try and remove the tumour which had been felt under the sternum.

At the second operation the anterior aspect of the neck was widely infiltrated with "Percaine" and adrenaline solution after morphia and hyoscine premedication. The thyreoid was displayed and a normal small lobe on the right side seen. The upper part of the left lobe was a little enlarged, but as it passed down the neck it was felt to enlarge and form the mediastinal tumour which subsequently was seen to be as large as a human heart. The tumour was firmly set in the thoracic inlet and it was quite impossible to free round it until the manubrium was forcibly distracted. Even then it was delivered only with difficulty. Fortunately no damage to pleura or great vessels occurred, and convalescence was uneventful. The mass was an adenomatous thyreoid.

This relief was made possible by local anæsthesia, but great advantage came also from the preliminary morphia and hyoscine. I gave grain 1/6 and grain 1/150 respectively 120 minutes and 60 minutes before operation. In more robust patients I often add a third dose 10 minutes before.

Yours, etc.,

DOUGLAS ROBB, F.R.A.C.S.

41 Symonds Street,
Auckland, New Zealand,
February 5, 1941.

PARALYSIS OF THE SERRATUS ANTERIOR MUSCLE COMPLICATING DISLOCATION OF THE SHOULDER.

SIR: In a report of a case of *serratus anterior* paralysis complicating shoulder dislocation by Dr. George C. V. Thompson, appearing in your issue of February 22, Dr. Thompson emphasizes the difficulties of management of these two conditions at one and the same time.

To overcome them, he suggests the use of an abduction splint as an alternative part of the treatment.

If, as he states, the action of the *serratus anterior* is to help the trapezius to raise the arm from the horizontal to the vertical plane, then this position of the upper limb would be a satisfactory one in imposing anatomical rest on a weakened or paralysed *serratus anterior* muscle.

In this much-debated movement of arm elevation, the *serratus anterior* is undoubtedly an essential motor engine, but only by virtue of the fact that it maintains apposition of the scapula to the chest wall, the actual motor power for this movement being supplied by the trapezius assisted by the *levator scapulæ* and the rhomboids.

The correct position of anatomical rest for the *serratus anterior* muscle, therefore, is with the hand of the affected side on the opposite shoulder, with the elbow at the side, and maintained there by a cuff and collar sling. In this position all winging of the scapula disappears and the use of a shoulder bucket or plaster spica is unnecessary.

It is therefore suggested that an abduction splint would impose a position unfavourable for the rehabilitation of the *serratus anterior* approaching as it does that demanded for anatomical rest of its opponent the trapezius.

As the after-treatment of a shoulder dislocation consists of immobilization in adduction for a period of a few weeks, it is difficult to understand why injury to the long thoracic nerve should provide further fixation problems.

Yours, etc.,

G. KEITH SMITH.

131, Macquarie Street,
Sydney,
February 24, 1941.

SOME MEDICAL ASPECTS OF CRIME.

SIR: Dr. S. F. McDonald deserves the thanks of all members of our Association for his very striking and pertinent criticism of Dr. Dark's recent article on crime.

The laudation of Russia and Russian methods (about which no one has any sure knowledge) is surely unnecessary in articles which purport to be scientific. Such laudation reminds one of the subtle propaganda methods adapted by certain "reform movements" and of which there is far too much in Australia. Further, why all this sentimentality about criminals—there is plenty of need for reform of a more urgent nature than reform of our prisons. Criminals, as Sir James Barrett rightly points out, are enemies of society, and such society has to protect itself from them; it cannot do this in a kid glove drawing-room manner.

Punishment is undoubtedly effective in great numbers, and in truth is the only method of sure evolution. We cannot hope to attain higher stages, physical, mental and moral, until each one is allotted the full result of his conduct. To make the way of the evil-doer easier is to extend and perpetuate evil doing.

Yours, etc.,

PAUL G. DANE.

111, Collins Street,
Melbourne, C.1,
February 25, 1941.

Obituary.

ERIC BAILHACHE.

WE regret to announce the death on active service of Major Eric Bailhache, of the Australian Army Medical Corps.

FRANK TIDSWELL.

We regret to announce the death of Dr. Frank Tidswell, which occurred on February 26, 1941, at Sydney, New South Wales.

Notice.

The next library seminar arranged by the Post-Graduate Directors of Medicine, Surgery and Pathology will be held at the Prince Henry Hospital, Little Bay, New South Wales, on Monday, March 10, 1940, at 4.30 p.m. The subjects will be: (*a*) "Diverticulitis", (*b*) "Infective Mononucleosis". A cordial invitation to be present is extended all medical practitioners.

The Honorary Secretary of the Medical Board of the Royal Prince Alfred Hospital, Sydney, announces that at the next meeting of the board, on Thursday, March 13, 1941, a clinical demonstration will be given by Dr. J. Colvin Storey and Dr. Grant Lindeman. The demonstration will be held at 4.30 o'clock p.m. All medical practitioners are invited to be present.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Sork, Ronald Cedric, M.B., B.S., 1940 (Univ. Sydney), Royal South Sydney Hospital, Zetland.
Follent, John William, M.B., B.S., 1940 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Inglis, Margaret, M.B., B.S., 1940 (Univ. Sydney), Sydney Hospital, Sydney.

Books Received.

"The Human Mind: The Organ of Thought in Function and Dysfunction", by M. Mackenzie, M.D., M.R.C.P.; 1941. London: J. and A. Churchill Limited. Crown 8vo, pp. 222. Price: 7s. 6d. net.

"Treatment in General Practice: Surgery (continued)"; articles republished from *The British Medical Journal*; Volume IV; 1940. London: H. K. Lewis and Company Limited. Demy 8vo, pp. 576, with 143 illustrations. Price: 16s. net.

"Virus Diseases of Man", by C. E. van Rooyen, M.D., and A. J. Rhodes, M.B., Ch.B., M.R.C.P.E., with an introduction by T. J. Mackie; 1940. London: Humphrey Milford; Sydney and Melbourne: Cassell and Company. Medium 8vo, pp. 967, with illustrations.

"Practical Orthoptics in the Treatment of Squint", by K. Lyle, M.A., M.D., M.R.C.P., F.R.C.S., and S. Jackson, with a foreword by C. L. Gimblett, M.A., M.D., M.R.C.P., F.R.C.S.; Second Edition; 1940. London: H. K. Lewis and Company Limited. Demy 8vo, pp. 356, 101 illustrations, including 5 plates. Price: 15s. net.

"Malignant Disease and its Treatment by Radium", by S. Cade, F.R.C.S.; 1940. Bristol: John Wright and Sons Limited. Super royal 8vo, pp. 1,289, with 623 illustrations, many in colour. Price: 75s. net.

"Highways to Health", talks by the B.M.A. Spokesman; 1941. Sydney: Angus and Robertson Limited. Crown 8vo, pp. 88. Price: 1s. net.

"The 1940 Year Book of Public Health", edited by J. C. Geiger, M.D., Dr.P.H.; 1940. Chicago: The Year Book Publishers Incorporated. Crown 8vo, pp. 560, with diagrams. Price: $3.00 net.

"Obstetrics in General Practice", by J. P. Greenhill, B.S., M.D., F.A.C.S.; 1940. Chicago: The Year Book Publishers Incorporated. Large crown 8vo, pp. 448, with illustrations. Price: $3.50 net.

"Vitamin Therapy in General Practice", by E. S. Gordon, M.D., M.A., and E. L. Severinghaus, M.D., F.A.C.P.; 1940. Chicago: The Year Book Publishers Incorporated. Large crown 8vo, pp. 258, with illustrations. Price: $2.75 net.

"Debatable Tumours in Human and Animal Pathology", by W. F. Harvey, E. K. Dawson and J. R. M. Innes; 1940. Edinburgh: Oliver and Boyd. Medium 8vo, pp. 131, with illustrations. Price: 10s. 6d. net.

"Diet and Nutrition for the Australian People", edited by F. W. Clements, M.D.; 1941. Sydney: Angus and Robertson Limited. Demy 8vo, pp. 99, with diagrams. Price 2s. 6d. net.

Diary for the Month.

MAR. 11.—Queensland Branch, B.M.A.: Mater Misericordiæ Hospital Clinical Society.
MAR. 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAR. 11.—New South Wales Branch, B.M.A.: Ethics Committee.
MAR. 11.—Tasmanian Branch, B.M.A.: Branch.
MAR. 13.—Victorian Branch, B.M.A.: Ethics Subcommittee.
MAR. 14.—Queensland Branch, B.M.A.: Council.
MAR. 17.—Victorian Branch, B.M.A.: Hospital Subcommittee.
MAR. 18.—Queensland Branch, B.M.A.: Ear, Nose and Throat Section.
MAR. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee.
MAR. 18.—Victorian Branch, B.M.A.: Organization Subcommittee.
MAR. 18.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.
MAR. 19.—Western Australian Branch, B.M.A.: Branch.
MAR. 20.—Queensland Branch, B.M.A.: Ipswich Hospital Clinical Society.
MAR. 20.—Victorian Branch, B.M.A.: Executive.
MAR. 25.—New South Wales Branch, B.M.A.: Council, Quarterly.
MAR. 26.—Victorian Branch, B.M.A.: Council.
MAR. 27.—New South Wales Branch, B.M.A.: Annual.
MAR. 27.—South Australian Branch, B.M.A.: Branch.
MAR. 28.—Queensland Branch, B.M.A.: Council.
MAR. 28.—Tasmanian Branch, B.M.A.: Council.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia: all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to The Medical Journal of Australia alone, unless the contrary be stated.

All communications should be addressed to the Editor, The Medical Journal of Australia, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, The Medical Journal of Australia, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

Subscription Rates.—Medical students and others not receiving The Medical Journal of Australia in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.